

Light

Warming  
&

Ventilation.



1871

1872

1873

1874



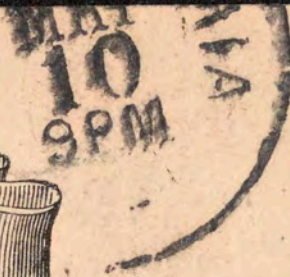
Dear Sir

5. 10. 79.

I think the plan Excellent. I would suggest under "Construction" or "Warmth" the inconvenience (as I find every winter) of 2, 3 or 4 rooms tapping one heat flue, & the evils of a large ash-bin in the cellar. In Ventilation the value of grates In Drainage you will of course allude to the ventilation of the Water Closet by Suction, <sup>draught</sup> ~~draught~~ & the imperfection of water-traps. In water-supply the value of inside plumbing to avoid freezing (which I have never yet had) also in Drainage to the value of exposed instead of covered drains - the need of water supply to heated air - the passage of  $\text{CO}_2$  thro' cash-iron - The Care of Country & Seaside Houses as well as <sup>those</sup> in the City.

Yours truly W. W. Keen





WRITE THE ADDRESS ON THIS SIDE-THE MESSAGE ON THE OTHER

D<sup>r</sup> Hartshorne

11 E. Penn St  
Germanatown



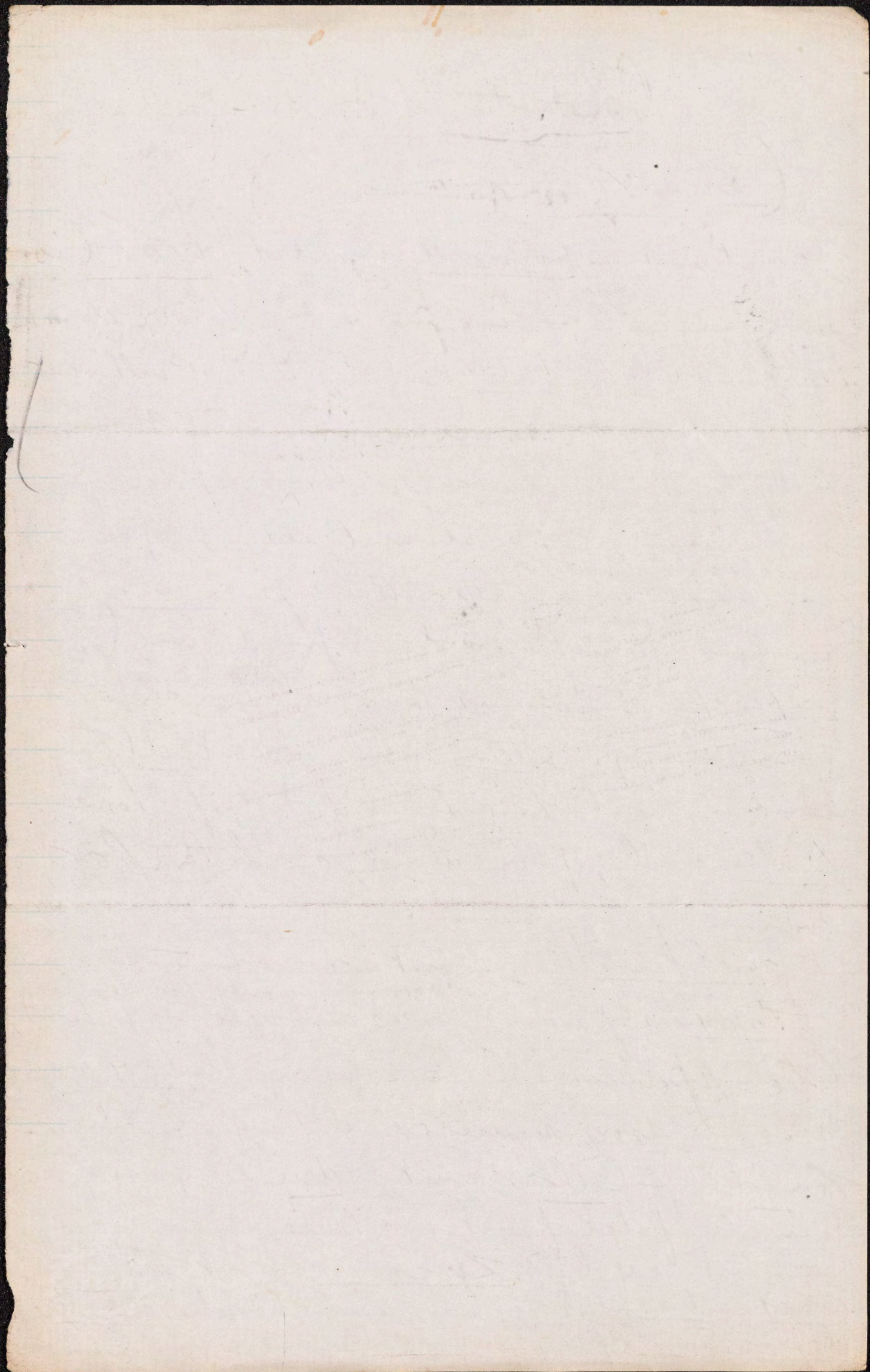
# Construction of Houses for Health

(~~See last page of notes~~)

Of materials — hygienically regarded, wood is unobjectionable; — being permeable to air & moisture, — while, if tightly put together, it will shut out dampness, as well as rain, almost as effectually as brick walls. <sup>extempore</sup> For hospitals during the war, one story buildings, of wood, raised above the ground, & with shade or an attic to keep excessive sun-heat from the wards, answered well.

Brick is somewhat porous, allowing air & moisture to pass slowly. Stone is less so, — but, all things considered, the best material probably for houses. Double walls, of any material, are better for evenness of temperature than very thick walls, the air between being the best non-conductor. Double sashes, also, a good arrangement, especially for winter. Proportions of rooms & houses ought of course, for health, to be spacious, for air-purity. Plenty of windows and doors secure circulation of air, & light. Foundations & Cellars, must be dry. Dampness of a cellar is a 'fatal fault' in a house. Artificial flooring may correct it if slight. Zinc over it, next best. For floors, wood, or tiles; stone, only in hot climates. Roofs best double & sloping. Sources of dampness in a house, — ground, roof, walls, & condensation.



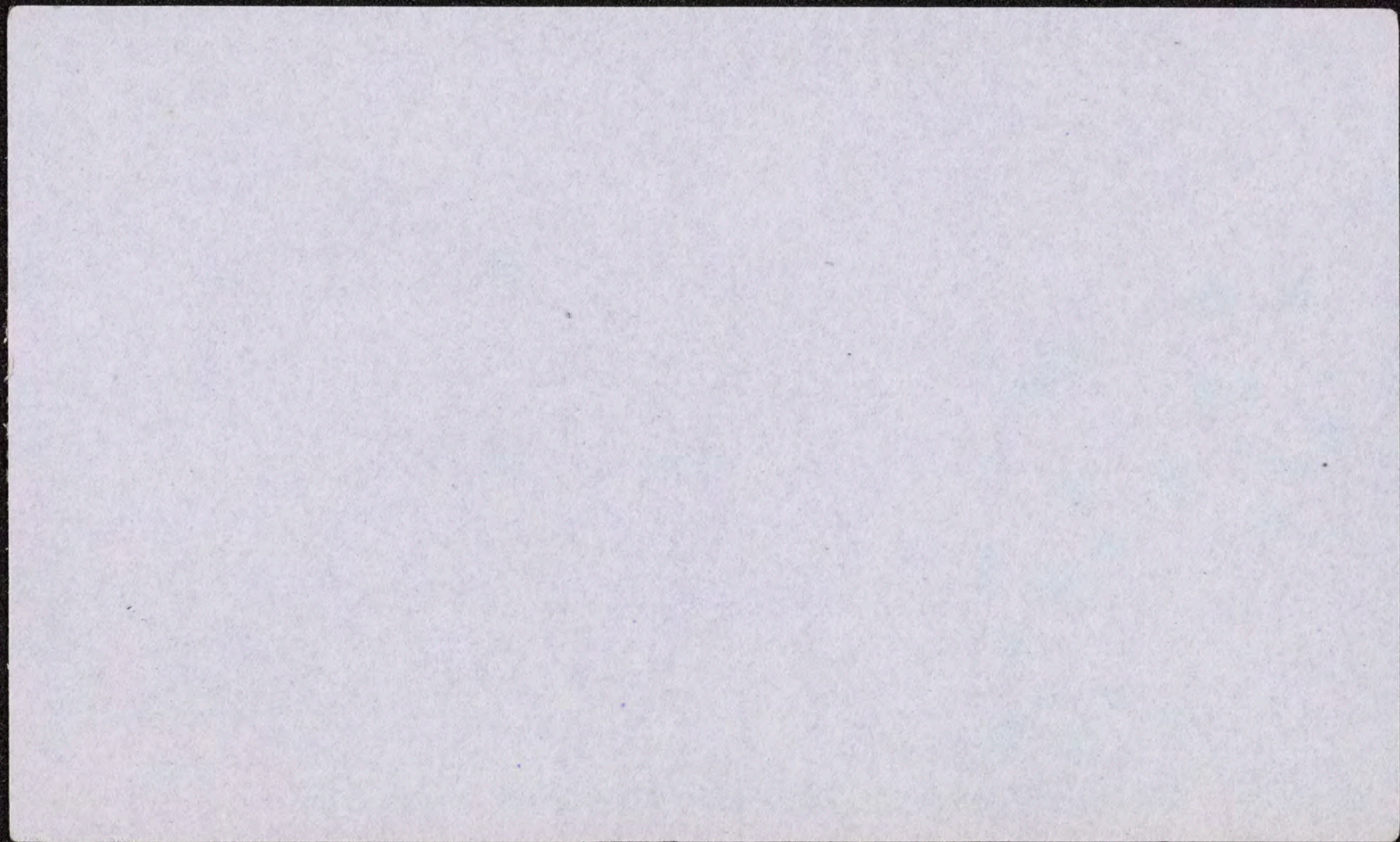




Prof. Doremus (Buffalo? Medical College)

cut: a block of build'g sandstone, 12 in  
by 4 or 5, with a panel  $\frac{1}{2}$  in deep  
sunk on each side; in each panel a block,  
perfor. by gas-pipe, & cemented at edges;  
the whole then coated with impervious varnish.  
Blow out candle through it. Pressure of gas  
of house supply sent thru enough to light burn.







2 parts cold tar  
1 part pitch, &  
to each bucketful, 3 handfuls  
of quicklime.  
For waterproofing foundations  
of houses. —



Matth. 16. 26    who

John. 14. 27 - Peace  
230 - hath

John 16. 33 - I have

1 Cor. 2. 12    we have

Esa. 5. 14 - world is

Isa. 1. 27 - and the



Light, -

Warming, -  
&

Ventilation.



(T. Winslow <sup>"On the Influence of Light"</sup>)

Light. ←

①

Hippocr. said - "Old men double their age in winter, and rejuvenate in Summer." This, so far as it is true, must be ref. to conjoint action of light & heat. The ancient Romans

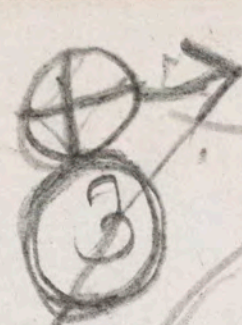
had terraces on their houses called "solaria" to back in <sup>seen and</sup> air. The young Pliny wrote of the elder <sup>the great naturalist,</sup> "If he had leisure in Summer after dinner, he <sup>would</sup> lie down in the sunshine."

The influence of light on vegetable life is indispensable; on animal life it is important. The development & transformation of tadpoles, <sup>for instance,</sup> is delayed, if not arrested, by darkness. In the Mammoth Cave of Kentucky there are very few animals, and these few are mostly blind. <sup>grounded black or colorless,</sup> ~~Some~~ beetles, raised in exclusion of light are said to be white; & so are the under sides of flatfishes; - and the larvae of insects that burrow in the earth, or in fruits or nuts. Men living in underground mines never have good health. Temporary seclusion in darkness is said to favor the fattening of poultry when well fed; but even this fattening ~~is~~ is not ~~necessarily~~ a sign of good health. Actinism is a term applied to the chemical influence of light which (as in photography) is a property possessed by some rays which are scarcely luminous to the eye; and these actinic rays probably have influence upon animals & men. See Planchon's *Traces of Light*, showing wonderfully under blue. M. B. B.



→ In Liverpool, not many years ago, 30 to 40,000 people lived in cellars.  
The law cleaned up part of these out, in 1849. Similar reforms in Edinburgh & Towns throughout Lancashire.

Every part of a house (accessible to sun) should be allowed to receive its rays part of every day.



"Where the sun never enters, the physical can enter often." Stationer  
Excess of light however, may

cause injury to sight - even blindness.

Hemeralopia (seeing only in daylight) occurs not very rarely among persons exposed for some time to glare - as at sea in the tropics - over a chalk formation in parts of France near the Seine - & among soldiers marching over sand or snow. - It is said (H. W. Williams of Boston) to be cured by repose of the eyes for some days in total darkness - gradually coming out. Sudden emergence is distressing. Dionysius the ancient tyrant is said to have punished prisoners by obliging them to come at once from darkness into whitewashed, unroofed rooms.

Snow & ice-blindness are <sup>not un-</sup>common in the Arctic regions.

Photophobia of moderate degree is best met by plain - if severe, by blue glasses. Either will also shield the eye from the wind and dust. Glasses <sup>also</sup> protect from the glare of artificial lights. But (unless lenses are needed), they should be removed when reading.



2

Iron & Linen ! Woolen

Neuralgia (Hand & my self)  
cases

Sun Bath ! —



\* Thus Shakespeare, in Othello:

~~It~~ is the very error of the moon;  
She comes more near the earth than she was wont,  
And makes men mad."

"Moon struck madmen"  
Milton: Paradise Lost.  
"non-corpos mentes"  
of the influence of the moon.

Blackstone's Commentaries, defining  
of non-corpos mentes  
speak of the influence of the moon.



~~minerals~~

Dy. Dr. L. L. L. '89

5th 5 Buffalo 5 cany

Chlorine on shaded side

1 st for 1 survey.

A ship in N. Orh '88

Caser 4 feet to 1, ditto -

Miss X. Hightyle 58 too

Shady side of hospin Smey  
She says, - "axis of land should be N. & S."

in the returning to diff

has been forbidden

Shady side hospin sold in  
over

Jefferson Barracks



*Bacteria*.—Dr. Arthur Downes and F. P. Blount, Esq., have presented to the Royal Society the result of some most interesting observations on the effect of light on bacteria and other organisms. The record is too long to be given in full, but the deductions may be summed up as follows:

1. Light is inimical to the development of bacteria, and the microscopic fungi associated with putrifaction and decay.

2. Under favorable condition it wholly presents that development, but under less favorable it may only retard.

3. The preservative quality of light, as might be expected, is most powerful in the direct solar rays, but can be demonstrated to exist in ordinary diffused daylight.

4. So far as investigated it would appear that it is chiefly but perhaps not entirely, associated with the actinic rays of the spectrum.

5. The fitness of a cultivation liquid, to act as a nidus, is not impaired by insulation.

6. The germs originally present in such a liquid may be wholly destroyed, and a putrescible fluid perfectly preserved by the unaided action of light.

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In 1881 all the students in the regular course will study Greek.

— The appropriation of \$2,000 for improving the public grounds on Central Hill, Somerville, was non-concurred in by the aldermen. It was voted, however, to reduce the salaries of school teachers from \$6,500 to \$6,200.

— The winter term of the High School at Brookton finished Friday, March 8, with exercises by the middle class, consisting of a duet, essays, declamations, recitations, and dialogues.

— It is found that there are 156 salaried officials who will have to resign or move into town, in case the pending order that all employees of the city must be citizens of Boston, is adopted. All but 30 are connected with the schools.

— The Hon. Clark Jillson, of Worcester, will deliver the poem at the next reunion of Nichols Academy alumni, at Dudley, in June.

— Next year an elective in German literature will be given by Professor Bartlett, of Harvard. The course will begin with Lessing (1750), and embrace the German classic writers to the present day.

— The exhibition of the Worcester Art Society, which was booked for March 8, and the succeeding eight or ten days, was







~~Notes out here~~



<sup>Heating Houses.</sup>  
The oldest construction that we know of among the Romans  
was for heating - (Dr. J. Watson,  
Simple focus or clibanum.  
Hypocaust of  
Ancient Romans - Discourse  
at N. Y. Hosp.  
Feb. 1857

Derived from brick-kiln.  
mason-work, with flues for  
diffusion of heat - no provision  
for intro. of smoke or vapor.  
First used for bathing rooms,  
then for private dwellings.  
No chimney - mouth at the  
outer wall - thro' which smoke  
passed as from an oven.

Subject to leakage - Em-  
peror Julian, by leak & exhala-  
tion into his chamber, was overpowered  
& nearly smothered by being taken  
out - Emperor Jovian was  
so suffocated -

Even in ancient times the  
focus & brazier were all piped,  
The malt-kiln is now a hypocaust.

Dixes (killing) place, Dixes (killing) place, Dixes (killing) place



x Said by Hans Egede, a missionary  
writer quoted by Hammond, to have  
been used in a Dominican convent  
in Greenland, even in the 14<sup>th</sup> century!

Dr Martin Friewald,  
a Swede, used hot water pipes  
to heat a greenhouse, 1716,



2

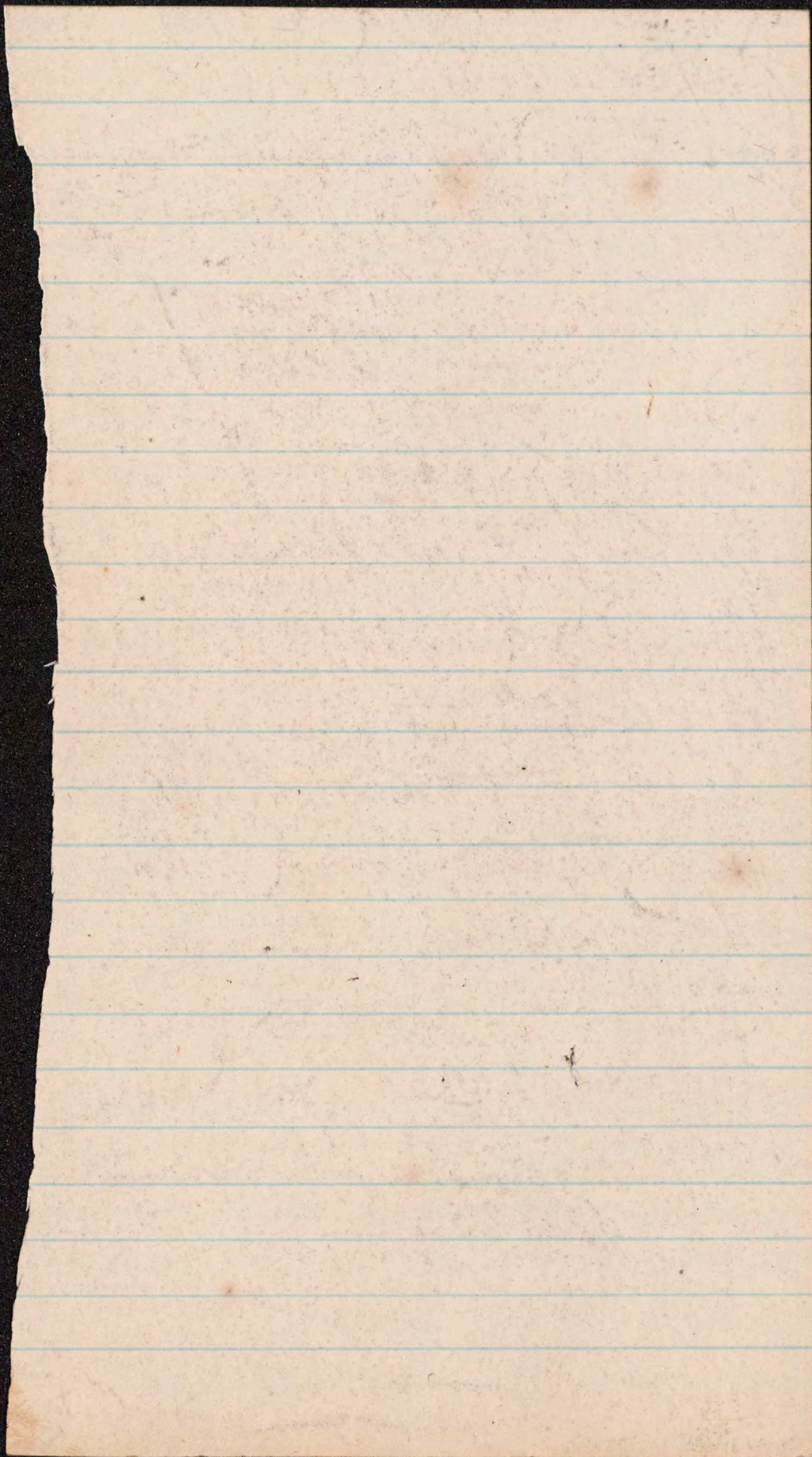
(Focus was in the centre of  
the room; so usually was  
the clibanum or brazier.)

In castles of English Normans  
(10th), of Middle <sup>the fire was</sup> ages, moved  
to a deep recess against  
the wall. smoke find vent  
at loop hole of roof, or by an  
open turret, or louvre  
window at side.

Chimneys invented by the  
Italians, early part of 14th  
century. Most improvements, in that and  
the following century, began in Italy.

Water stove, quite  
probably <sup>first</sup> used by ancient  
Egyptians for hatching  
eggs — In modern Europe,  
introduced into France in latter  
part of last century as  
(Bonnefants) Chicken Stove.







For dwellings, first in 3  
England by Marquis of  
Chabannes <sup>about 1816</sup> ~~in the last~~ <sup>century.</sup>

Steam apparatus for  
warming, only an adaptation  
of boiler of steam engine.  
Watt used it to warm  
his office 1784-5, - City  
the steam escape & evolve  
its latent heat. Boulton  
used it further, 1795, with  
metallic pipes, in Birmingham.  
Woolle of England, (sooner) 1791,  
obtained a patent for an apparatus  
not essentially same as that  
now used. (Swedenborg)  
Dr B. Franklin is said to have  
invented the first stove like the present ones.  
But it was an open fire in mid-room,  
with air from beneath.



~~X Paid (Hammond notes a mission) Hans  
X Eggs to have been used in a Com-  
mission in Greenland in 18<sup>th</sup> cent.!  
Bonnewin, for hatch chickens~~



**Kakelungs, or Swedish Stoves.**

GOTENBERG, SWEDEN, April 20, 1874.

MR. EDITOR:—In an old note book, kept by the writer during a tour in North Europe a year or two since, I chanced upon an entry as follows:

"The amount of fuel consumed in warming houses is generally inverse to the amount of cold to be combated."

The truth of the proposition has been strangely and fully confirmed by a more extended and careful examination into the plans of warming adopted in North Europe, and it is with some fear that the facts may seem incredible that this is written for an American journal. To begin with facts; I will mention that we are now living in two rooms of a hotel, one 20 by 20 feet, the other 20 by 15 feet, the ceiling 12 feet high. Opening into these rooms is one common entrance door and a pair of huge folding doors.

The weather during March was cold, even colder than in Philadelphia or New York, and during this month the number of fires used were about *four in a week*, each fire consisting of from eight to ten billets of wood twelve inches long, or about enough to *start* two coal fires in America. The rooms were thoroughly warmed, and the temperature, night and day, never varied five grades or degrees. The quantity of fuel consumed I will place at one-twentieth part of what would, under similar circumstances, have been required to warm the same rooms in America, and yet we pride ourselves on "what we know about house-warming."

I may mention that my son has been here during eight months past, occupying two rooms even larger than those of which the dimensions are given. He purchased last fall one "Fam," about 200 cubic feet of wood, of which on the first of March *one fourth was left* after firing all winter. The warming is done with a kind of stove called a "Kakelung," and so far as your correspondent can judge, on principles that are more scientific than those of our many patent contrivances, whose double function seems to be to consume fuel and stifle the inmates of our dwellings. This last is known a strong proposition, but it is based upon personal experience, at the end of three months spent in a first-class dwelling (with modern improvements) in Philadelphia last fall. A sense of relief was felt when we escaped again to old foggy England, where patent heaters are unknown.

The fact is, that American people are oblivious to the frightful effects that come from their system of heating, and only become aware of its discomforts and dangers after passing a winter with English grates or the "Kakelung." To return to the last-named system, a "Kakelung" is simply a great stove of masonry, covered with porcelain plates, having usually five flues, through which the gases of combustion must pass up and down, a distance of 30 to 50, or even 60 feet, before escaping into the air. The general principle of their operation is to provide enough material to absorb all the heat from the fire—to conduct the gases through these long flues until their temperature has fallen to a point that no longer gives off heat. The quantity of the material in the "Kakelung" is so great that the temperature from one firing (which is always enough) will not raise the temperature of any part so much that the hands cannot be held upon the outside.

Two hours after a fire is made, and after the wood has burned up and the flue been closed, the "kakelung" begins to get warm on the outside, the light porcelain plates give off their moderate warmth to the atmosphere, in the room, and ten hours later there will not be much difference in the temperature of the stove or of the room.

A "kakelung," instead of being an unsightly obstruction, is so constructed as to constitute an ornamental piece of furniture. Doors open into them in front, where in a kind of closet, with iron shelves, food can be kept warm or warmed. Baking can be done in the furnace for hours after the fire has been burned out. In the Grand Hotel Rydberg, at Stockholm, the writer created some merriment by inquiring whether the "kakelungs" were simply erections to support the mirrors and flowers with which they were adorned.

Now this result in heating which has been described, is in a great measure due to double windows. The conducting power of a thin pane of glass interposed between the external air and that of a warm room, is never imagined until an experiment is tried. Such cooling does no good, it simply costs money, and answers no purpose of ventilation, and, speaking from actual experience, I would rather live in a room hermetically sealed and warmed by a "Kakelung," than in any room into which burned air is conducted from one of our American furnaces. I am well aware of the scientific arguments and explanations that have been put forth in reference to American house-heating. They are good on paper; the practice is what I refer to, and it is without fear of making a mistake, that I assert that any house in Philadelphia can be warmed with one-fourth the amount of fuel, and with twice the comfort, by means of Kakelungs, as with furnaces—if other conditions peculiar to heating here, are at the same time observed.

J. RICHARDS.



# PAENSYLVANIA RAILROAD CO., TREASURER'S

Department, Philadelphia, May 2, 1874.

## NOTICE TO STOCKHOLDERS.

Board of Directors has this day declared a annual dividend of FIVE PER CENT. on the 1 stock of the Company, clear of all taxes, payable 30th.

May 30th, dividend will be paid to ladies only; that date they must await their turn with stockholders.

Attorneys can be had at the Office of the Company.

EDMUND SMITH,  
Treasurer.

## 4 LUMBERMEN'S INSURANCE COMPANY. 1874

OFFICE, NO. 427 WALNUT STREET.

AUTHORIZED CAPITAL, \$500,000.

CHARTER PERPETUAL.

Exclusively FIRE INSURANCE, in the city of Philadelphia and vicinity. Risks taken at the BEST RATES consistent with SAFETY, either PERPETUAL or TEMPORARY policies.

DIRECTORS: 1874.

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PH H. COLLINS, JOSEPH J. WILLIAMS

ES R. GATES, LEWIS DAVIS.

ARD HOOPES, GEORGE WATSON,

HUGH McILVAIN, PRESIDENT.

O. G. CROWELL, SECRETARY.

WARRANTEE

TRUST AND SAFE DEPOSIT COMPANY.

CAPITAL, SUBSCRIBED.....\$1,000,000

CAPITAL PAID IN.....500,000

Temporary Office, S. E. corner of Chesnut and

streets, until the erection of a fire and bur-

proof building on lots Nos, 316, 318 and 320 Ches-

nut street.

Deposits of money received on interest at three

per cent., payable by check, without notice, and at

four per cent., payable by check, on ten days'

notice. Interest, as may be agreed upon, allowed

on sums deposited to remain a specified time.

The Company is authorized by law to act as Ex-

ecutors, Administrators, Guardians, Assignees, Re-

ceivers, Trustees, Committees, Agents and execute

business of every description.

Trust investments are inscribed in the name of

parties for whom they are held, and, with the

funds, are kept separate and apart from the

assets of the Company.

OFFICERS.

W. AM H. RHAWN, President.

S. BROWN, Vice President and Treasurer.

M. HAZEL, Secretary.

W. LES S. PANCOAST, Solicitor.

DIRECTORS: eod50

W. Am H. Rhawn, John Welsh, Jr.,

S. Brown, J. Barlow Moorhead,

W. Les Richardson, Edward C. Knight,

W. Les S. Pancoast, Elijah Coleman,

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SECURITY FROM LOSS BY BURGLARY,

ROBBERY, FIRE OR ACCIDENT.

THE FIDELITY INSURANCE, TRUST AND

SAFE DEPOSIT COMPANY

OF PHILADELPHIA,

IN THEIR

NEW MARBLE FIRE-PROOF BUILDING,

NOS. 329 AND 331 CHESNUT STREET.

Capital subscribed, \$2,000,000.

Capital paid, \$1,350,000.

UPON BONDS, STOCKS, SECURITIES, FA-

IRLY PLATE, COIN, DEEDS and VALUABLES

of every description received for safe-keeping, un-

der guarantee, at very moderate rates.

The Company also Rent SAFES INSIDE THEIR

BURGLAR-PROOF VAULTS, at prices varying

from \$15 to \$75 a year, according to size. An extra

charge for Corporations and Bankers; rooms and desks

joining vaults provided for Safe Renters.

DEPOSITS OF MONEY RECEIVED ON IN-

TEREST, at three per cent., payable by check,

without notice, and at four per cent., payable by

check, on ten days' notice.

INCOME COLLECTED and remitted at one per

cent.

The Company act as EXECUTORS, ADMINIS-

TRATORS and GUARDIANS, and RECEIVE and

EXECUTE TRUSTS of every description, from the

deaths, Corporations and individuals.

ALL TRUST INVESTMENTS ARE INSCRIBED

IN THE NAMES OF THE PARTIES FOR WHOM

THEY ARE HELD, and, with the TRUST FUNDS,

ARE KEPT SEPARATE AND APART FROM

THE ASSETS of the Company.

B. BROWNE, President.

STEPHEN A. CALDWELL, Vice President.

JOHN B. GEST, Second Vice President.

ROBERT PATTERSON, Secretary and Trea-

surer.

DIRECTORS.

B. Browne, Stephen A. Caldwell,

Frederic H. Clark, George F. Tyler,

John Welsh, Henry C. Gibson,

Edward W. Clark, J. Gillingham Fell,

Alexander Henry, Henry Pratt McKean,

William H. Merrick. eodtf5

GROCERIES, TEAS, LIQUORS, ETC.

SALT AFLOAT—SALT AFLOAT—14,560 BUS.

from Turk's Island, 3950 sacks Verdin's fine, 10,850 sacks

in pool ground, now landing and for sale by

ALEX. KERR & BRO.,

126 North Wharves.

WILLOW'S INDIGO BLUE.—ORIGINAL AND

unexcelled for Blueing Clothes. Put up at

WILTBERGER'S Drug Store, No. 233 N. Second

street, Philadelphia. Every Grocer and Druggist

should sell it, and every housekeeper buy and use

it. D. S. WILTBERGER, Prop. tuthsl6t\*

MARKETING.—HOUSEKEEPERS LIVING

even as far south as Walnut and Chesnut find

their interest to market at OXFORD MAR-

KET, Oxford and Twentieth streets, by reason of

cheapness and excellence. 2t5

ROMATOES—QUINTON BRAND, THE

finest in flavor, solidity and purity. 1t\*

THE BEST AND LARGEST QUANTITY OF

Cider Vinegar in the city, made from apples, by

the proprietor, (therefore warranted) and for sale

per gallon or barrel. HENRY KERPER, Main

and Hartwell avenue, Chesnut Hill. 4t\*

ROMATOES—QUINTON SOLD BY PRINCIPAL

Grocers. Buy only Quinton brand. 1t\*

ROMATOES, QUINTON; PRICES REDUCED

to close the season's stock. 1t\*

ROMATOES.—QUINTON WHOLESALE AGEN-

cy, 45 North Water street. 1t\*

ROMATOES

No. 1

Pass

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Open fire places. "Chimney Corner"

wood fires — radiator heat only — fine ventilation  
border huts on western prairie — big blaze of fire & door <sup>wide</sup> open:  
have to turn around like meat on a spit, to keep the whole body warm.  
Loaves

rad. & conduct heat — little

ventila. — Dryness — need water over

Theaters — Latrobe — &  
Cellar<sup>2</sup> furnace

Theoretical mill — need

ventilating care — large air chamber, with air from <sup>(out of)</sup> doors.  
[might have warm air all under the floors, & around walls.]

Best, now, furnace place (open in entry  
as well as room) & low down grate.

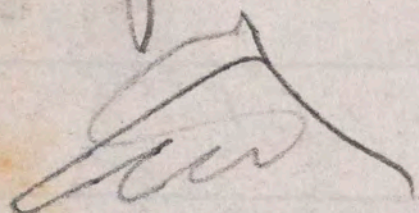
~~Why not warm air under floors between walls?~~

Hot Water pipes ~~are~~ (safest & least trouble)

& Steam pipes ~~(used by mill)~~ very well —  
also need arrangements or care for ventilation.



[End of 20th Lecture, 1873]



Overlooked decoration of birth &

Construction of Houses

~~note not here~~



## NEW Ventilation -

5

Lower - open turret -  
lattice window - chimney,  
windsail -

rotary centrifugal  
fan, air pump, &

Company of Farmers

~~Many of the birds~~  
~~of the large forest~~

ventilation was known to the  
Ancients — ~~ancient~~ "mud" ~~ancient~~ ~~ancient~~

Acron, Pythagorean  
philosoph. & physician, nearly a  
century before Hippocrates,  
is said to have arrested the spread  
of an epidemic at Athens, by  
kindling numerous fires in diff. parts  
of the city (Littre, Quæst. Hippocr.,  
tom. 1, p. 17). Celsus alludes to  
beneficial effect of fire, & says heat  
over-



of air & elevated exposure  
in pump rooms and of sick rooms.

~~a. E. Mudgett - Ag. Ro. long bellows~~  
Agricola, in 16<sup>th</sup> cent., states

that in Germany it was customary to remove foul air from mines by suspending a fire in mid. of shaft, to create an upward current.

Pyramid - also - the  
Downward current is a modern invention.

Attic fireplace & flue to remove foul air from small apartments beneath, was first applied to old English House of Commons, more than a century ago (in 1600).

Ancient Romans used bellows for ventilation.



Rotary or centrif. fan (7)  
works by crank, & air  
pump in form of immense  
pair of bellows, <sup>in Germany</sup> used to  
inject pure air into &  
force out foul air from mines  
in 16th century. a triple  
barreled air pump, works  
with a crank by hand power,  
was invented by Dr Desagu-  
liers, in 1727, to remove  
impure air from mines of the  
Duke of Westmoreland; it  
could discharge about 10 cub.  
ft. of air a minute. The same  
philos., having to remove his vent-  
ilating fire from attic of old  
House of Commons, placed  
over



in its stead, over the top <sup>8</sup>  
of the building, the rotary  
centrifugal fan, which  
still goes by his name, for  
drawing up foul air. This  
was erected 1736, & was  
in use 84 years. It is  
still used for ships &  
factories; & can be worked  
either as forcing or sucking  
pump. Was once <sup>employed</sup> ~~used~~ in  
wards of N. Y. Hospital.  
Dr Blake (of London) 15<sup>th</sup> ships  
lungs 11 invents in last century,  
drawing a turn of air at a  
stroke, - was like an immense  
pair of bellows.  
Amos



in removal of foul air, &  
introduced by him into  
House of Lords was  
afterwards carried out  
by Dr. Reid & others,  
with the most favorable  
results. "Darcy, however,  
appears to have been but  
badly rewarded for his trouble  
accordg to an epigram of  
the time.

~~"For buying 20,000  
holes the Lords paid  
nothing; & their souls!"~~

In N.Y. Hospital,  
Downing's system was intro-  
duced (described 1820) 1829.  
It was formerly employed



by Evelyn; first 1/2  
appl. to Hosp. use by  
Wm. Strutt, at the Infor-  
-maz of Derby, England.  
The ~~introduced~~ fresh air  
thru' an underground  
culvert 4 1/2 ft. wide  
2210 ft long, commencing in  
an upright shaft in open  
ground near the building;  
which shaft was mounted  
by a turn cap, the mouth  
of which was constantly to  
the windward. The air enters  
thru' this tunnel, after being  
heated by a furnace, ascen-  
ded upward to the sick rooms,  
which it reached at openings



(Sutton) A breuer of London 9  
in last century, ventilates the  
holds of ships by <sup>the</sup> cooking  
fire on deck, drawing up air  
thru tubes connected with the  
ash pit of the fire place.

Sir Geo. Paul, about 1820,  
ventil. wards of hospital,  
the foul air from near ceiling  
of every lower ward being  
drawn up thru a flue  
& conducted thru the fireplace  
of the room overhead, to its  
chimney. (The Evening 1793,  
described an upward ventilating  
current in same manner, sub-  
stituting a wide metallic pipe  
for the foul air flue or  
chimney, & a smaller tube within <sup>over</sup>



then, instead of the fire, is

Mr Deacon invented  
the "Eolian Apparatus"  
1813, forcing air from beneath  
by a fan, thro' earthen or  
metallic tubes, the sides of  
which were immersed in boiling  
water; & when thus heated,  
it was allowed to rise upwards  
into the dwellly apartments.

By using cold instead of  
hot water, he could temper  
the air also for summer use.

The gimlet-hole system  
of ventilating apartments, de-  
vised by Sir Wm Dawkins,  
for equalizing degrees of fresh  
air, & preventing strong draughts



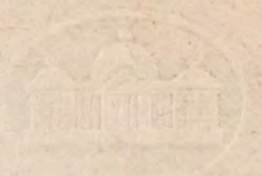
Examples illustrating evils of defective ventilation — Dr. Ettrich's cases of typh. fever in a very fine house in this city — from a bad privy & watercloset. — Dr. P. Earle's account of Maplewood Institute in N. England — 66 cases of typhoid fever in 77 pupils — from bad privies & ill ventil. dormitories.

Proprietor of a large factory in Manchester, England, having enlarged a working room before badly ventilated, — soon had to increase the wages of his employ-  
és; — on account of their appetites becoming so much better, — it took more to <sup>keep them fed</sup> enable them to live.

So also the members of an Edinburgh dining club, with a paving of the ceiling of their dining room, found their capacity of appropriating their dinners expensively increased.

Dr. E. Harris has publicly expressed the opinion that 55 per cent. of mortality of large cities is from foul air.







Quincy Mass, 1876

As a definite demonstration of such an influence, — at Blackwell's Island Workhouse, N. Y., in 1866, when there were occurring 34 deaths a day from cholera, L. W. Leeds & Dr. T. Hamilton obt. permission, to remove all the patients, & gave extra blankets to all the well prisoners & turned them out of doors all day; the cholera diminished greatly at once, — & in 6 days disappeared.

Yet, — to show how singular such truths may be misapprehended sometimes, — the Philada. Board of Health, in the summer of 1866, distributed a printed circular of advice thro' the city; — to aid the people to prevent or avoid cholera; one of its injunctions was, — for all families to shut up all their windows at 4 o'clock every afternoon, & keep them closed until 7 o'clock the next morning! (I have a copy of that circular.)



\* Gen. Morin asserts that an ordinary sitting-room, occupied, should have its air, if possible, renewed 5 times in an hour.

Ritter system: what?



Ventilation; renewal of air -

Quantity of air needed -

about "gallon a minute -

(E. Smith) - 350 c. ft 226 hrs -

700 - 1000 - 1500 - 2500 -

really best, - 1200 to or 3000  
But - 2000 c. ft per hour!

fixed upon for amount of suppl.  
really needed for pure labile air.

air. ~~^~~ ~~^~~

Some school-rooms  
or 200  
100 cub. feet per scholar!

How got? Naturally, - by

Inlet 10 or 11 ft high  
outlet same - & chimney besides

1<sup>st</sup> Diffus. of gases - constant

& needs no continuation  
[action of trees & plants also] Artificially available by  
2<sup>nd</sup> Wind - at sea by sails -

conls - chimneys above - funnels -

3<sup>d</sup> - Differs density of cold & warm air -  
within buildings - spontaneous

Natural vent. - Artificial  
Putrid. of author's new for natural methods.





~~Notes out here~~

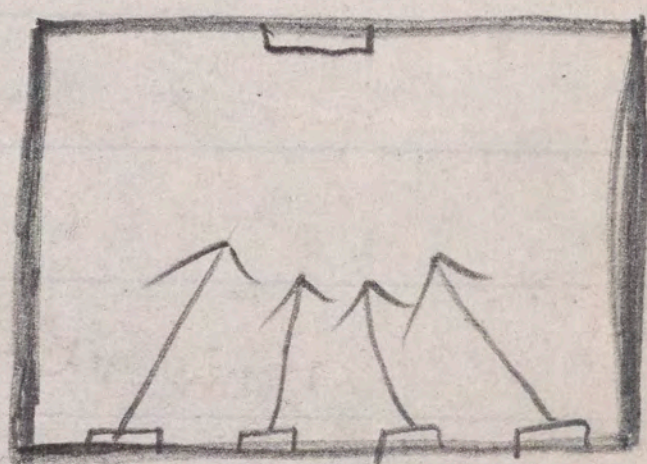
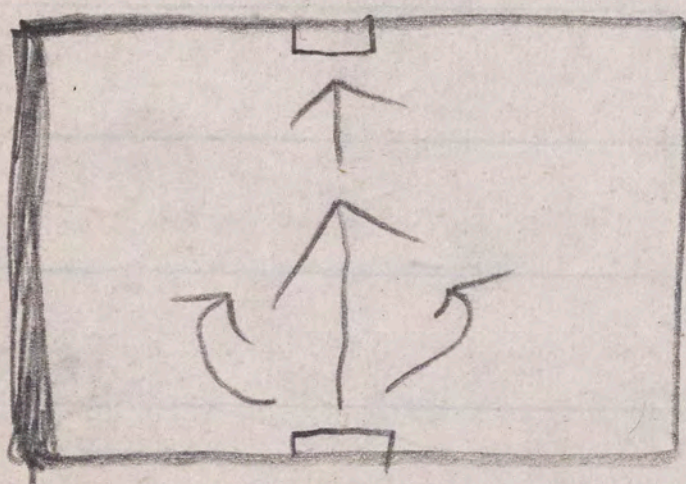
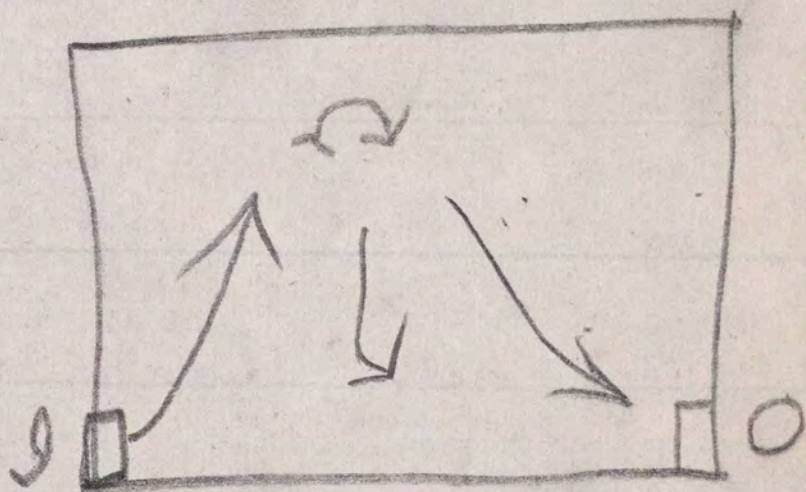
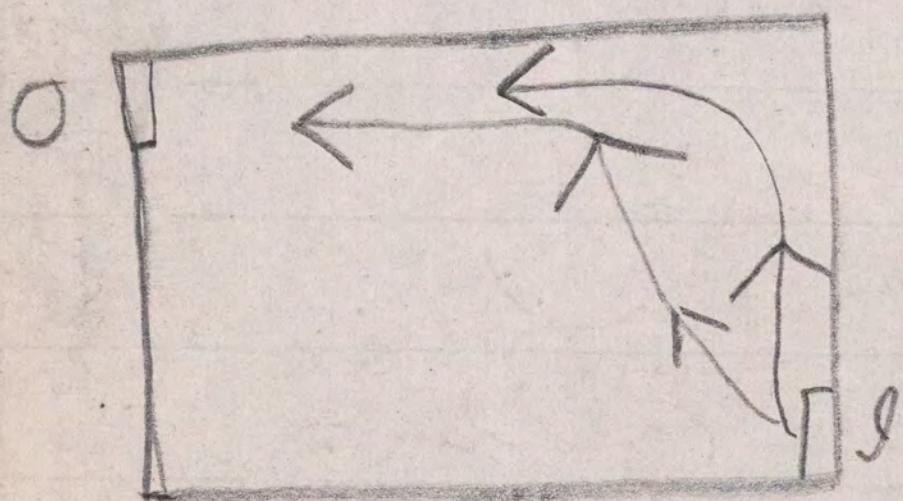
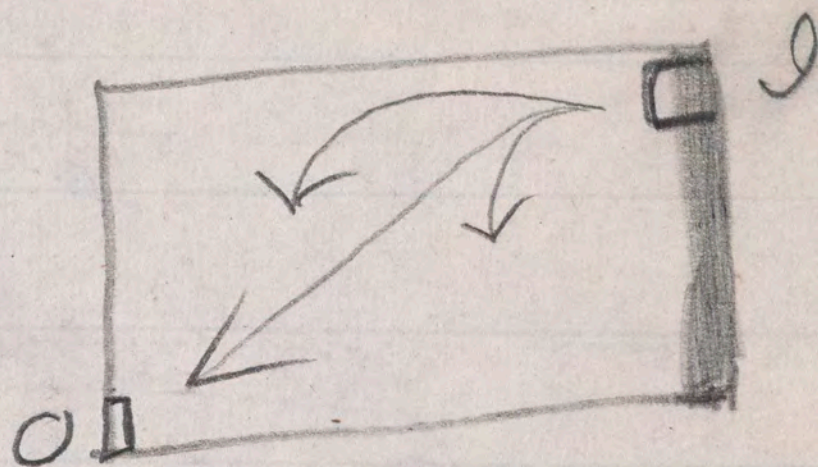
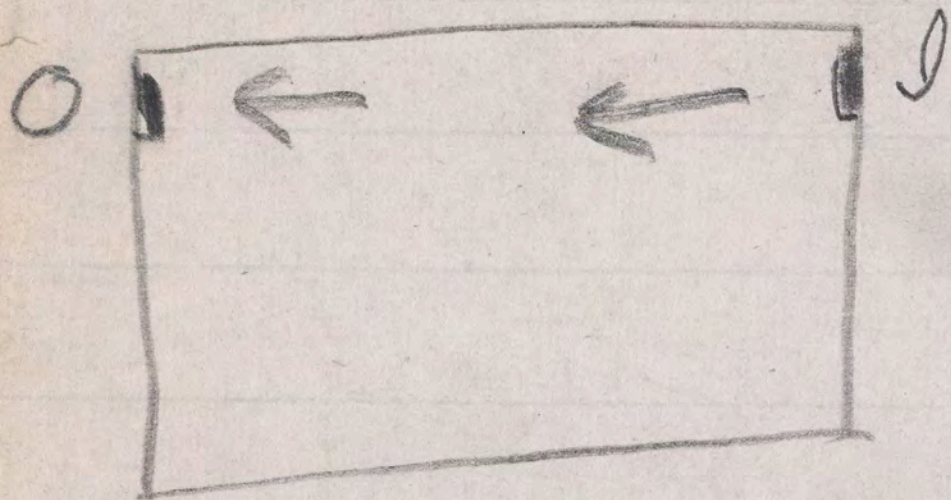


Thus all the Principles of ~~theoretical~~ ventilation  
are simple: ~~yet~~ the appliance of  
them sometimes a complex problem.

### Objects:

1. That of moving uniformly, through  
a building, the required amount of fresh  
air.
2. Duly Distrib, that to the different  
rooms —
3. Properly diffuses it in each room.
4. Causes <sup>removal of</sup> vitiated air to depart from  
~~the ceiling to all parts of the rooms~~  
~~by buildings.~~
5. Warming the air in cold weather.
6. Supplying it with moisture.





Central Buildings &  
Moody & Sanborn Dept M's House.

Ridge Vent.



All these objects to be attained

1. Private Dwellings -

2. Schools -

3. Lecture Halls - ~~or~~ <sup>or</sup> ~~theatres~~ <sup>concerts</sup> &c

4. Church-buildings -

5. Theatres -

6. Court Houses - &

Legislative Buildings

Capitals &c

7. Exhibition Palaces -

8. Libraries <sup>Reading Rooms</sup> & Museums -

9. Hospitals - 10. Prisons -

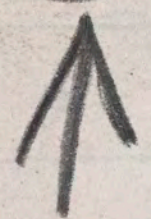
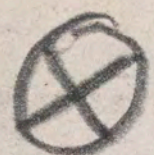
11. Almshouses - 12. Barracks -

13. Manufactories - 14. <sup>Guard houses</sup> ~~Ships~~ ~~Shambles~~

15. Stables - 16. Menageries - 17. Clothouses

18. Mines - 19. Sewers - 20. R.R. Cars -





[Illustrate the "principles" by  
experiments before class.]

Height of Ceilings is to be  
considered in connection with the principle  
of the Diffusion of gases.

What becomes of our expired breath?

Up? or down?  $\text{CO}_2$  dense - but  
all warmed. See vapor on frosty day, from  
nostrils; smoke from cigar or pipe -

Soon smoke descends; breath diffuses!

Some again would say to lighter enough to ascend.

Alon. Nightingale - Hammond - &  
others: current opinion!

Against it - 1<sup>st</sup> fact of <sup>law</sup> diffusion of gases.

Prof. Rogers, about rate & completion of dilution,

2<sup>d</sup> - densimeter experiment. Cathedrals abroad -

San Spirito Hosp. at Rome - 70 ft

2 Hospitals in 1862, - one 30 ft & one about 49 ft.

Have all ceilings as high as possible.

No Hospital ward less than 20 feet - better 30 feet.



1st Principle Difference of mass  
2nd & 3rd both really come under one:  
Principles applicable in meteorology

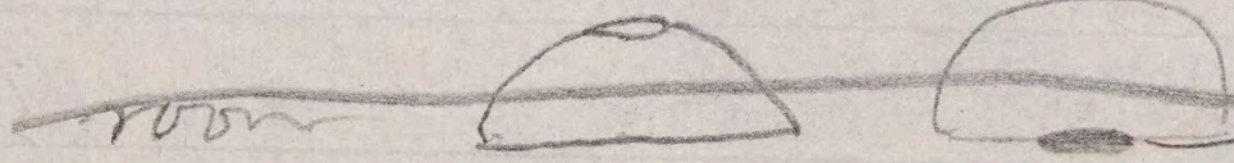
The equal density of air in its  
different parts from diff. of temperature.

Monsoons & Trade Winds — (Explain)  
Sea breeze — tendency toward land all day —  
Winds may be called by  
(Oceanic Currents likewise.)  
and ventilation  
High regions of air cold — because far from the earth and  
varied by ~~different~~ <sup>by lower pressure</sup>  
Heat — expands & lightens air —  
Cold and descends;

Box with water, oil,  
or mercury into water.

a man out of doors:

crowd out of  
doors in hot weather  
or troops marching.



Three places — old man



End of 6<sup>th</sup> Lecture  
1872.

End of 21<sup>st</sup> Lecture  
1873

Omitted by oversight,

last third of page on Light,

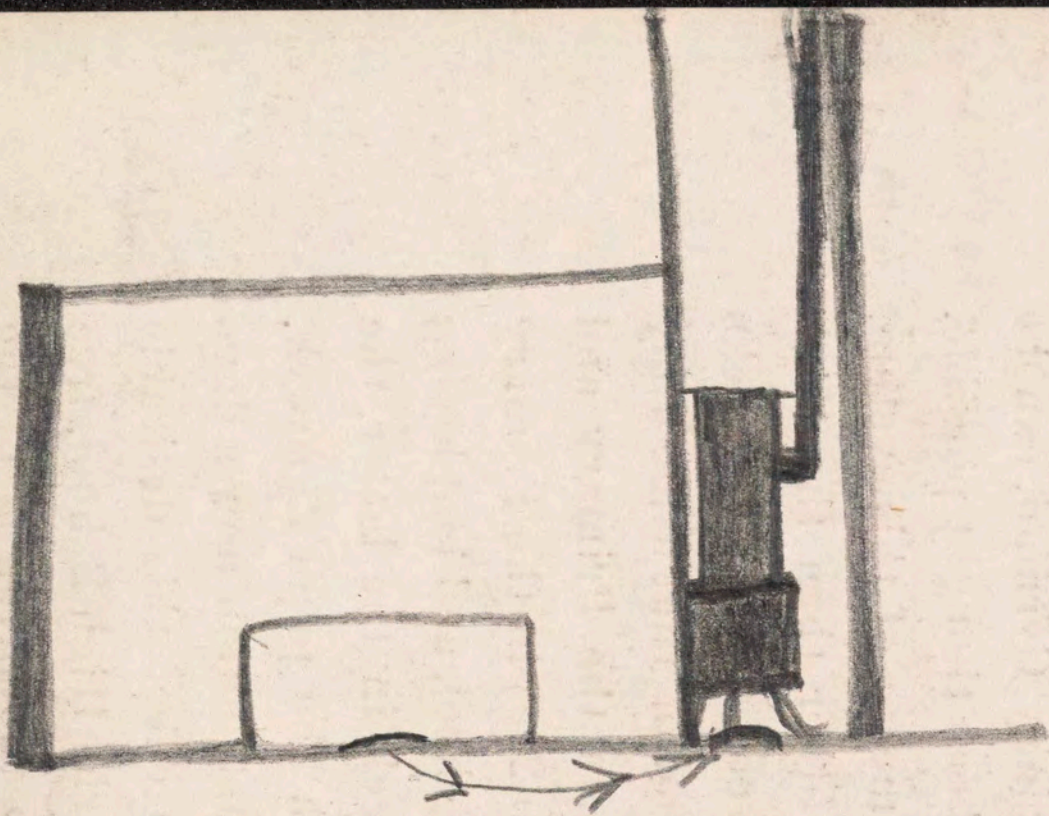
about construction of Houses.

Barker's arrangement (show model) is this:

A register is placed at the bottom of an air flue, ~~which runs up to the chimney.~~ ~~at the~~ In this flue, back of the register, is a parabola-shaped iron hood or reflector, up against which comes, from the heater below, the warm air; — it is, by the reflecting curved surface, thrown out, entering the room only through the upper half of the register. Its heat causes it to tend upward & circulate through the room. On each side of the "hood-reflector," the flue is open, at the <sup>top</sup> of the register under the heat-inlet. The cooler air of the room, therefore, flows in, or is forced to gravitate into, that part of the register, — & being warmed by the hood, ascends & goes out at the flue. Holman, actuary at F. Inst. says it is complete.

the new theory of the new theory of the new theory





## Ventilation

1. Spontaneous ("Natural").
2. By Heat-Currents, <sup>expressly</sup> provided.
3. By Forced Currents  
(Fans or Pumps).

Throughlets are not always inlets or outlets.  
Many small openings are better than one or two large ones.

Perforated pane — Sloping transom —  
Stick under bottom sash — Main's pipes  
inlet hole admission of warm air —  
Warm Double walls — Floors  
Steam or hot water pipes don't ventilate { nor furnaces  
with closed rooms

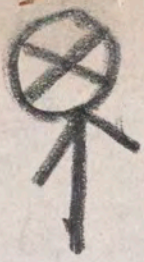


IN TRANSMITTING TO

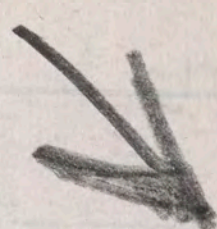
*Accepted*

this copy of my American System for Instruction in German, with my compliments and thanks for numerous favors received from the press, I beg to state that languages, and especially German, can be taught in schools at an earlier age and with greater rapidity than has ever before been thought possible. I have stated to the gentlemen composing the High School Committee that, by means of this system, German could be taught to all the children in the public schools of Philadelphia other than the High School, without additional expense, simply through my devoting one half-hour a week for twelve weeks to the instruction of the young lady pupils at the Girls' High School. At the end of that time they would be competent to teach the book again on becoming themselves teachers in the Primary and Grammar Schools. Commencing with the children's part of the book (pages 139 to 220) in the Primary School, and continuing with the grammar part (pages 19 to 138) in the Grammar School, and employing but twenty minutes twice a week in the former, and thirty-five minutes once a week in the latter, the information thus early imparted, kept up and increased weekly and growing with the pupil's growth, would amount to a considerable store of knowledge and practice, at an age when instruction now-a-days just commences—that is, at the age when the pupil enters the High School. To effect this desirable result, I would cheerfully give my services in teaching the young ladies at the Girls' High School, free of charge to the city, and the authorities could make their own contracts as to the printing of the requisite book or books.

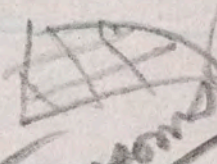




Windows



ventilator

double sashes — ways of fixing —  
sloping sashes at top   
Perfor. plate in — or transoms  
one pane hinged ~~at bottom~~ —  
Several a little open  
(reason.)

Slip of wood under open window at bottom; air thru middle.

~~Allegory of ceiling~~ what becomes of our breath? — Expl.

~~Consider that a ceiling maybe too high, I do not believe this to be so.~~

~~San Spirito, Rome, 70 ft. —~~

~~Dr Franklin — Darroth's chimy valve —  
Inlets — Outlets — Barker's~~

Total size — 48 sq. in per bed  
Relative size — Parker says outlets larger; Harris needs inlets.  
(see over)

~~(Position & direction)~~

~~Inlet — pure air — short tube —~~



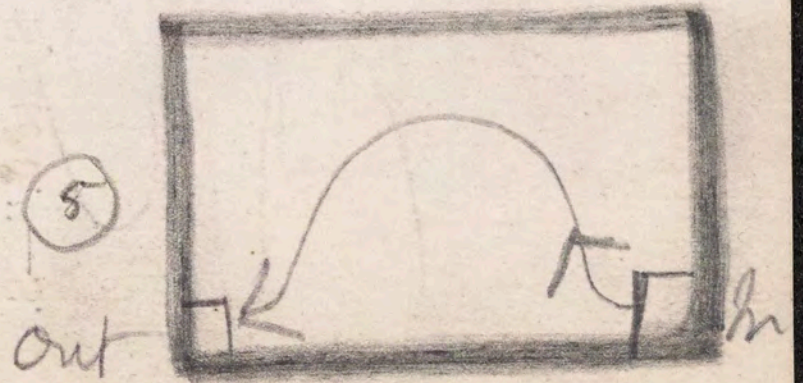
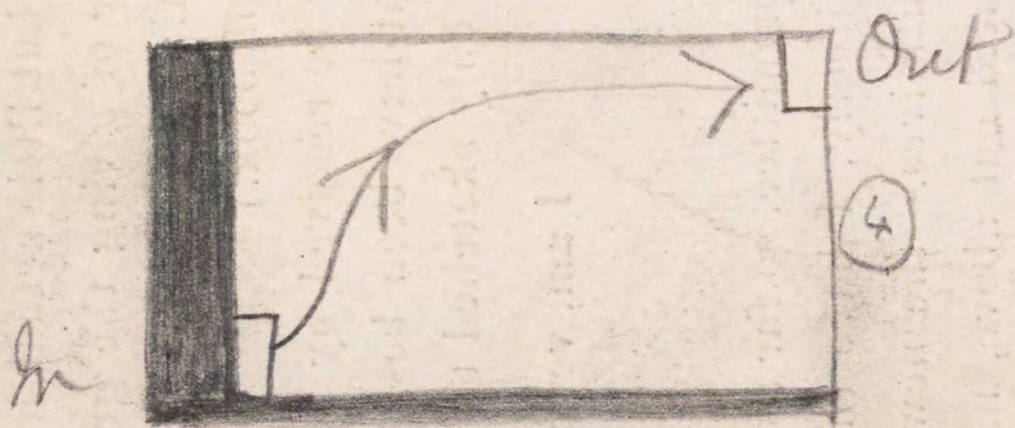
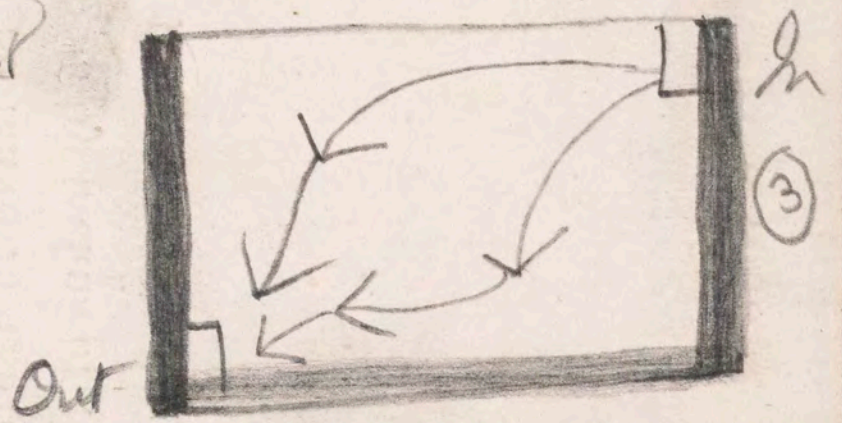
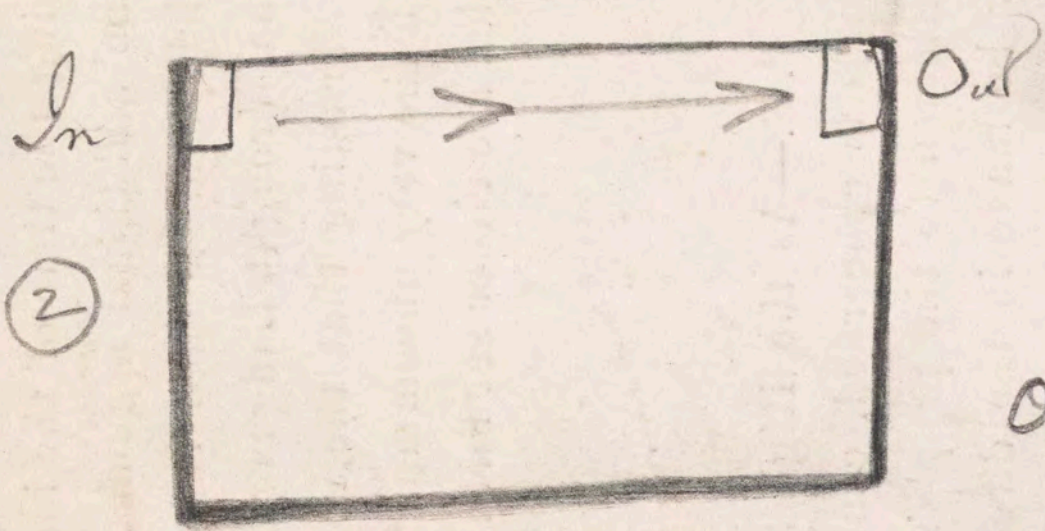
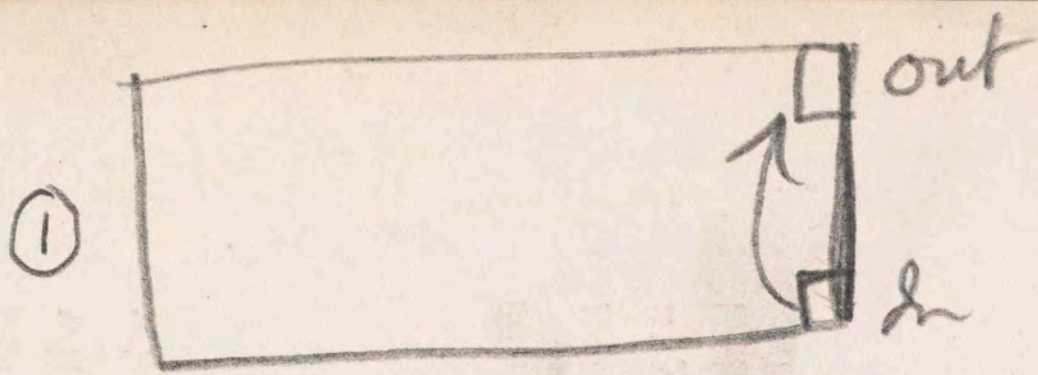
To change air of a room <sup>or ward</sup> 5 times an hour  
Gen. (Morm) - needs top of chimney to have 1 sq. in. for  
every 100 cubic feet of <sup>the</sup> room or ward, - & fresh air  
inlet 14 sq. in. for every 100 <sup>the air is</sup> cub. space. This is,  
however, more than necessary. If changed twice an hour,  
it will do very well. The need of air change is chiefly  
according to Warmed floor & walls,  
number of occu-  
pants of  
an apartment. an ~~outlet~~ used for ventil. express.

One throughlet does not  
always ventilate; the larger it is, of  
course the more likely to do so. ~

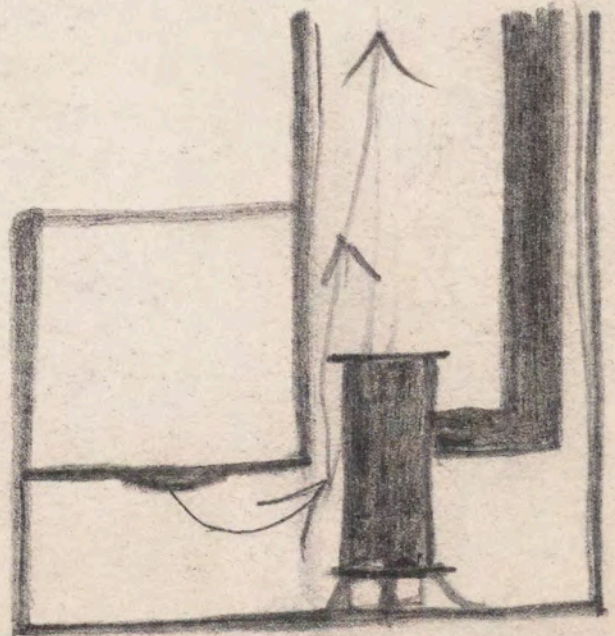
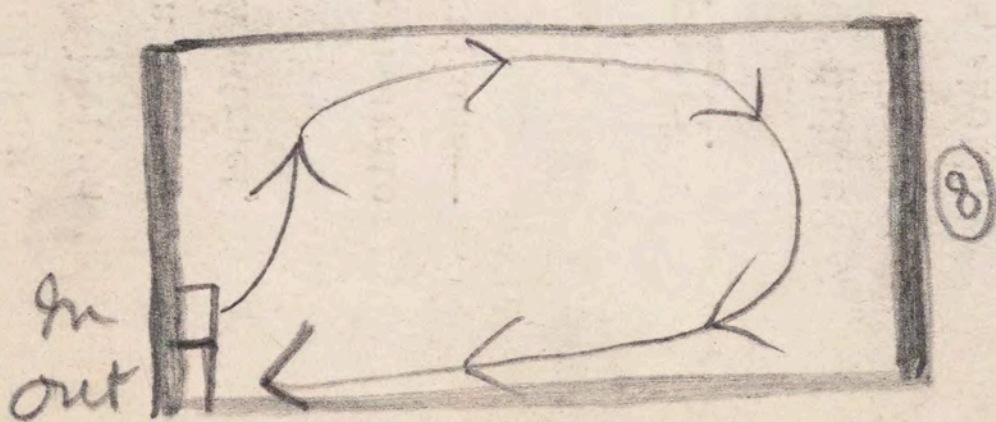
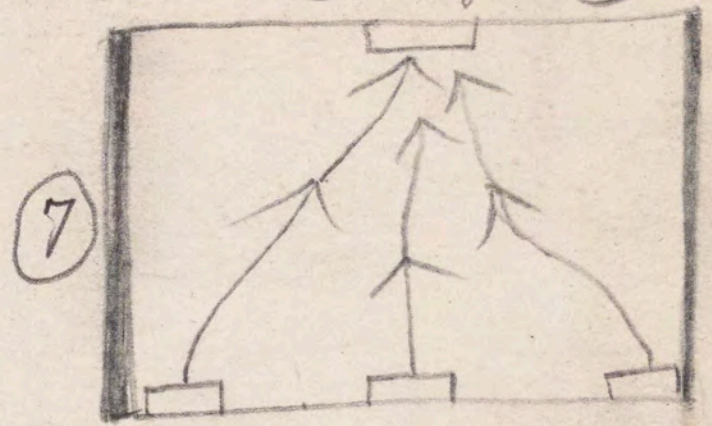
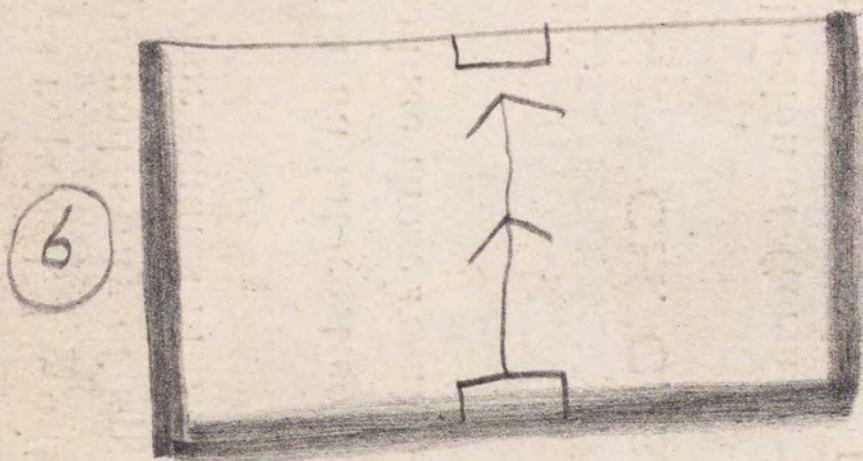
In FRCopie's conservatory, 1878-9, every plant  
was killed in one night by severe cold, although a  
warm air flue opened into it, - because there was  
no outlet to secure air movement through it.

End of 18<sup>th</sup> Lecture, 1868.





~~Ridge~~





could we want or time at the Girls' High School for such an additional study be objected, since during the time of the instruction but little actual home study is required, I would take this objection as an additional argument in favor of giving the greatest scope and sway of application to a system which promises such reduction in time in others—their own proper studies in English. (See Abstract, "The Wrought Language," at end of book.)

Trusting that the volume may be received by the press with an interest somewhat commensurate with the very uncommon labors that have been bestowed to produce those results—as simplifications—which are either set forth in full or only sketched therein,

I am, very respectfully,

CH. C. SCHAEFFER.

P. S.—As the High School Committee, so far as the introduction of German into the lower public schools is concerned, cannot act directly, I have thought best to mention what I suggested to those gentlemen to the people's representatives,—the newspapers,—so as possibly to aid the efforts, should any be made in the direction pointed out above, namely, of teaching German in all the American Schools by means of the "American System."—S.

PHILAD'A, November 9, 1875.







Notes out

End of 18th Lecture, 1870.



→ Leeds' problems: cold across floor  
hot across ceiling — hot up & across —  
warm below — down again out —

# Outlets

Make sure that they  
are outlets; openings  
are not always so.

In winter, warmed houses, without <sup>special</sup> heat, as  
draught, ←

Top: with heated chaff

maybe below

Best — warmed air in at floor  
on one side and out at floor the other,  
— being compelled to go out by up-  
ward shaft with heat-current — as a  
chimney fire. Or in middle, but both sides  
at floor.

So Mr Whittell's  
improvements at  
Phila. Hospital  
w. Phila.

My floor shall warm.

Parker's

~~For J. H. Lusk & Co.~~

~~Instance — manufacture factory —  
Edw. Club — Vernon Lippin arrested —  
to the Government~~

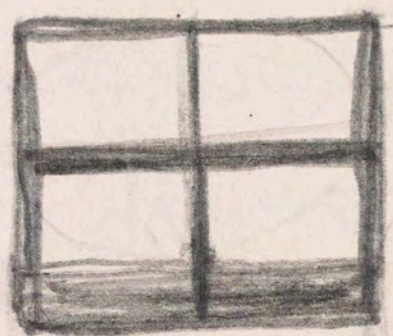


Mame's #

and a dentate



# Muir ventilator (English or Scotch)



Current down two openings & up two;  
the partitions going all the way through  
the floor to the room the ventilated. Best  
 at top of roof & above it. —, Ventilates  
without fire.



Especially good for

privies & waterclosets & vaults,

where no fire is kept burning.

The Wind draws in & out, or else

aspirates out & in. This (I believe) must

be its main dependence. Unequal, therefore.

Robinson, Boston, Agent.

Advisor Hutton thinks well of it.

over



# McKimell's ventilator (Parkes) (2)



Inner tube higher; hood over it.

Area of inner tube & enclosing ring equal.

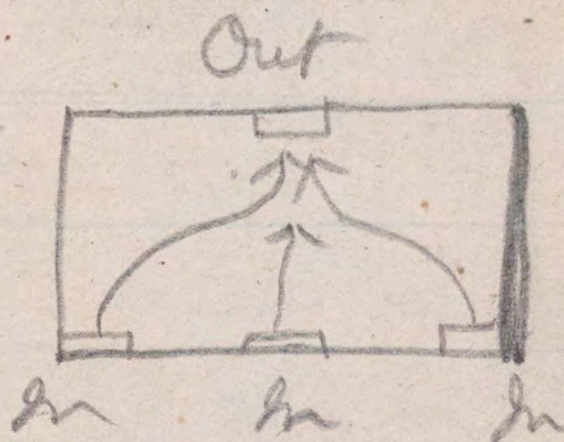
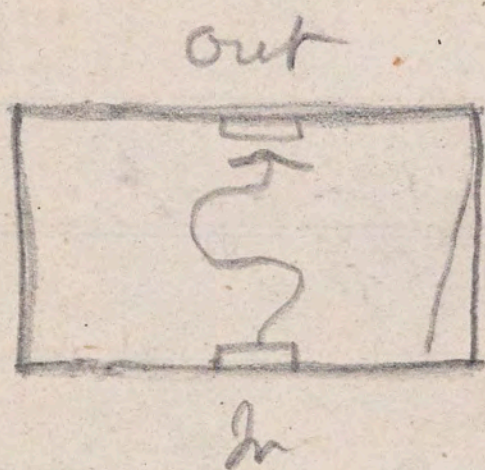
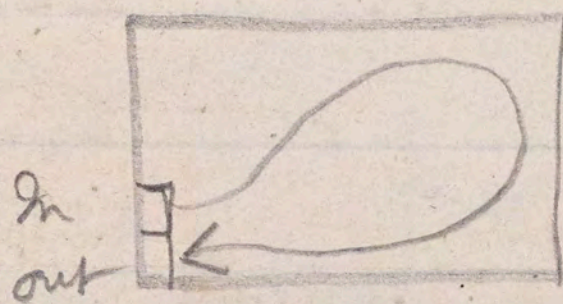
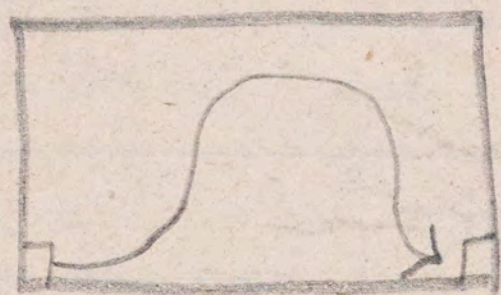
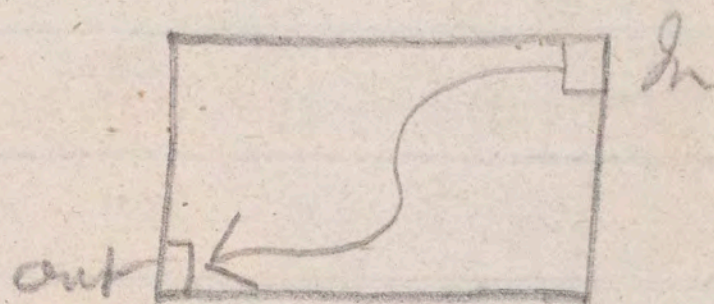
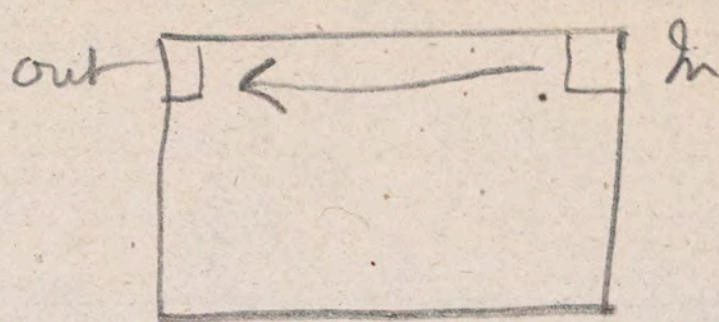
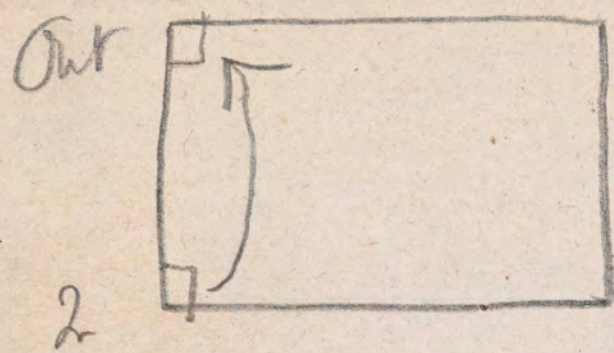
If a fire in the room, close outer tube,  
inner being then outlet, otherwise both inlets.

If doors or windows open <sup>with it,</sup> <sup>are</sup> both <sup>(Parkes)</sup> outlets.

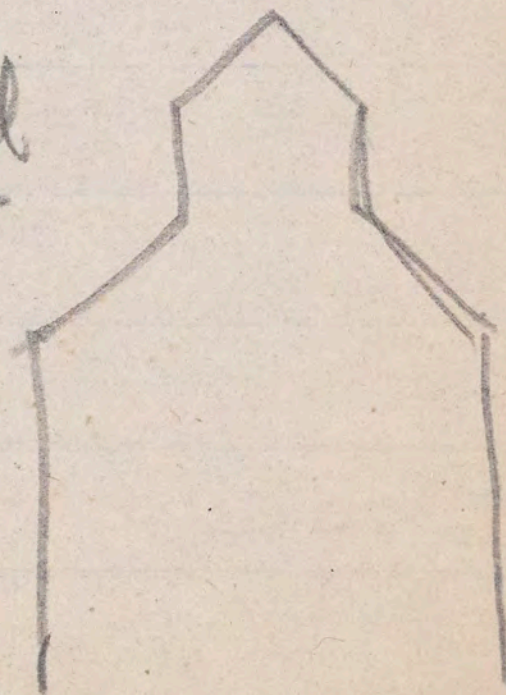
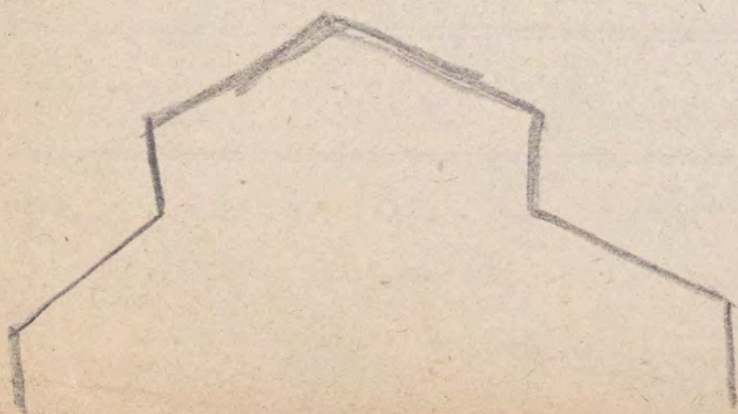
Best for round or square (not  
long) rooms. Size, from 5 or 6 in.  
for sitting room to 7 or 8 feet  
for a church building.

Parkes says it answers well.

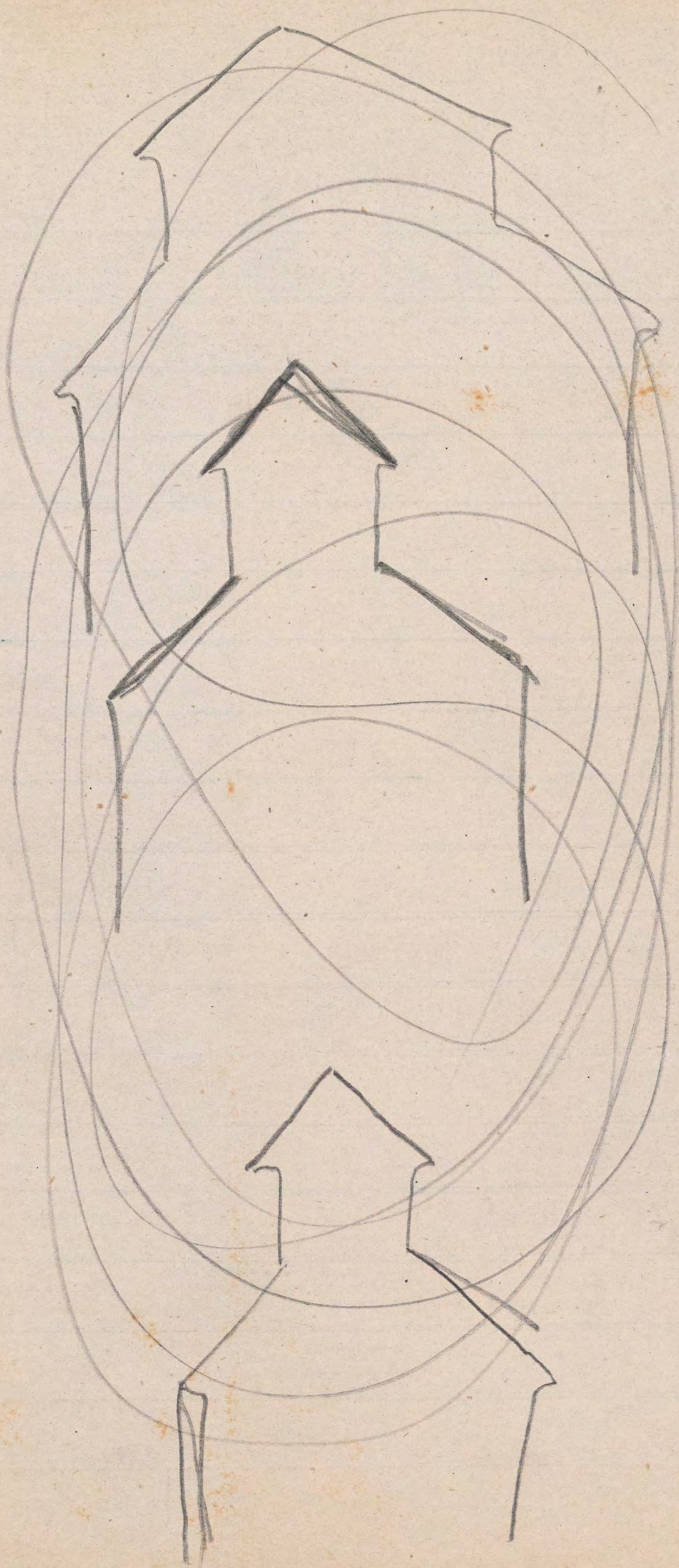




Ridge - Centennial  
ventilation









No 411 Broadway  
New York Oct 11. 1879

Mr Henry Hartshorn

Genoa

Dear Sir

Please find  
enclosed - description and one of my -  
Munich ventralis =

A model may be seen  
at Mess Cummings & Bore 43 N 7<sup>th</sup>  
st. Philadelphia -

Yours truly

John S. Hurler

p. C. C.



DESCRIPTION  
—OF THE—  
**“UNIVERSAL” VENTILATOR,**  
—FOR—  
FACTORIES, DWELLINGS, PUBLIC BUILDINGS, &c.

**JOHN S. HULIN, 411 Broadway, N. Y.**

Figure 1 of the drawings is a representation of a vertical central section of improved ventilator. Fig. 2 is a detailed side view thereof; and Fig. 3 is a horizontal section of the same. Fig. 4 is a detail, showing the notch.

This invention has relation to improvements in ventilators for houses, cars, and other places; and it consists in combining, with a flue leading into the place to be ventilated, a discharge flue, extending below the former and communicating with a number of spirally-arranged air-passages at the sides of the said ventilating flue, whereby a whirling current of air is created above the same, extending upward, which will draw the foul air up the lower flue, as will be hereafter more fully explained.

In the annexed drawings, the letter A designates the main ventilating-flue, the lower end of which extends down into the place—as a vault, car, or residence—to be ventilated. This flue tapers upward, and is of less diameter at top than at bottom, and it extends through the apex of a conical metallic disk or plate, B, of cast or sheet metal. C indicates the discharge flue, extending through the apex of a second metallic disk or plate, D, of the same size and construction as disk B. The flue C is of the form of an inverted cone, having a flaring upper end. Its lower end is of greater diameter than the flue A, and is on a level with it, as shown at *a*, Fig. 1, thereby forming an air passage, *b*, between the said flues, for a purpose hereafter explained.

The disks B D are spaced and connected together by means of spaced curved partitions *d*, terminating at their inner ends somewhat short of the main flue A.


When the conical disks are of cast metal, they will have curved ribs formed thereon, to which the upper and lower edges of the partitions *d* will be secured by rivets or bolts and nuts.

As shown in Fig. 3, the passages *e* between the partitions *d* flare outward. The air blowing through these passages forms a strong upward draft at the upper end of the main flue A, causing the foul air of the place ventilated to be carried up the discharge-flue into the open air. The upper end of the flue C is provided with a number of upturned horizontally-projecting hooks, *i*, that sustain a metallic capping G, of the form of a truncated cone, and extending after the manner of a penthouse, beyond the said flue. This capping is provided upon its edge with a notch, *x*, which readily permits it to be placed upon the hooks aforesaid and to be removed therefrom; but by turning the said cap until the hooks escape from the notch, the former bind upon the edge of the said capping, and hold it firmly in position. It may, however, be permanently secured to the tube A, if so elect. The apex of this capping is open, as shown at *h*, and is surmounted by a conical hood, J, spaced therefrom and connected thereto by rods *j*, the edges of which overlap those of the opening *h*. The passage of foul air is thus amply provided for, but the penetration of rain, snow, and other foreign matter is effectually prevented.

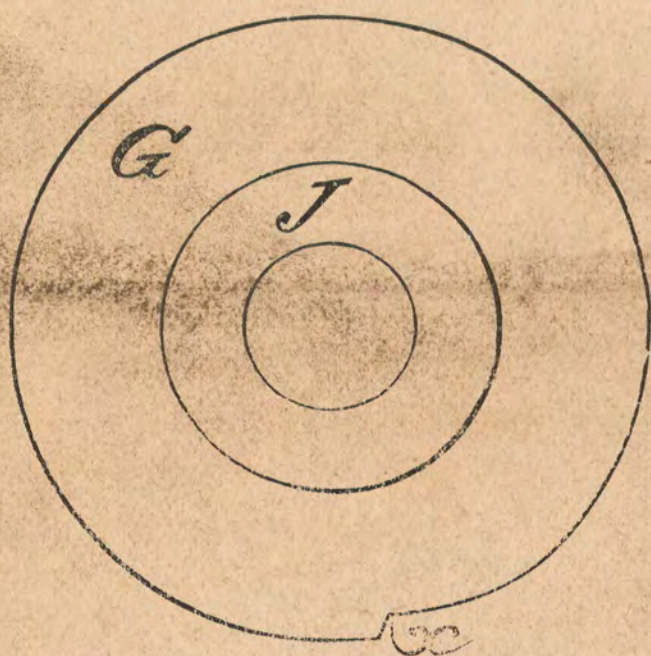
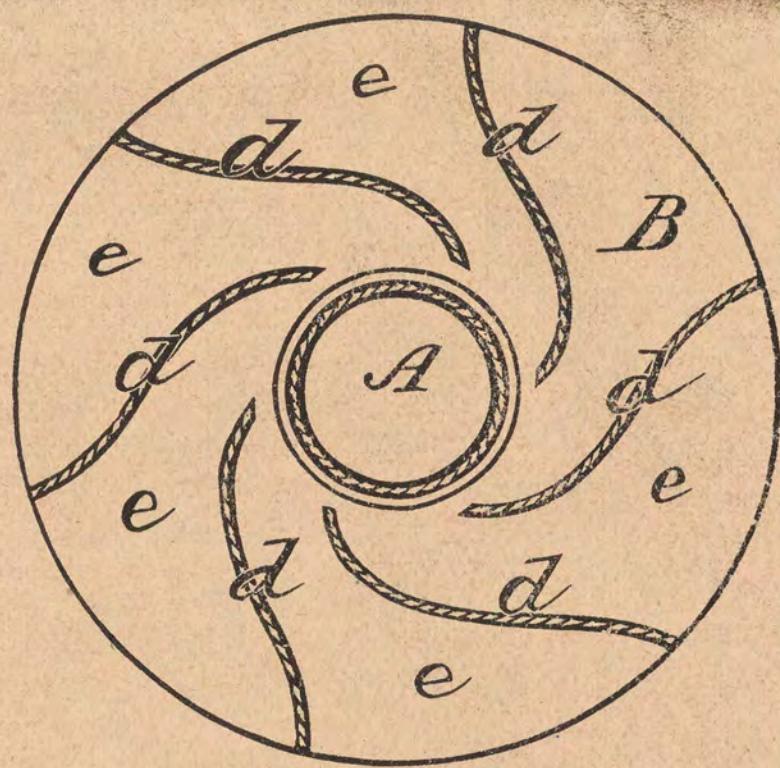
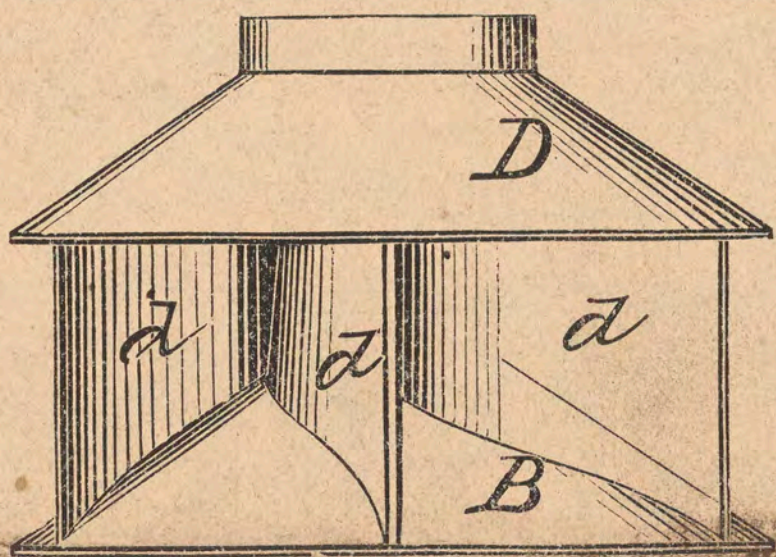
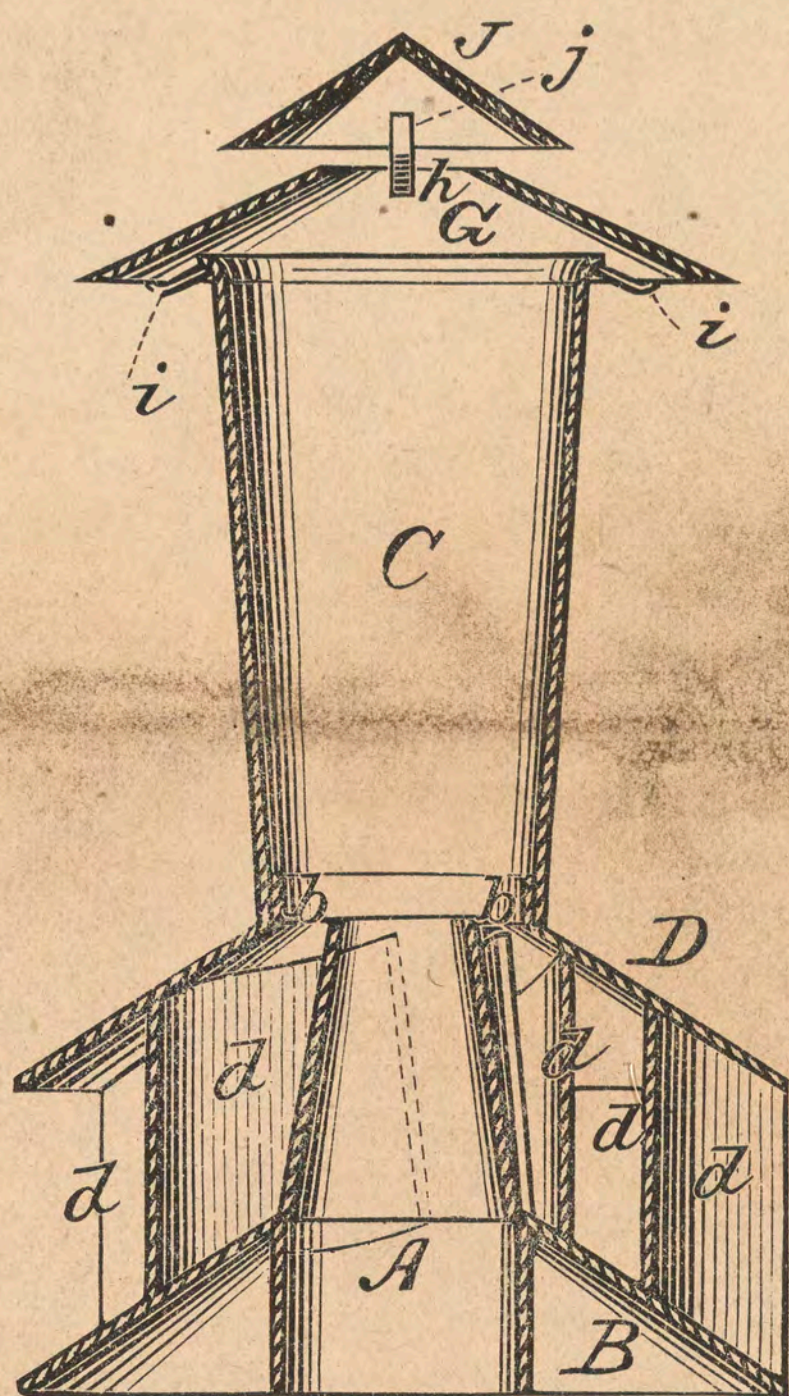
What I claim as new, and desire to secure by Letters Patent, is—

1. The ventilator device, consisting of the conical main flue A, the discharge flue C, forming therewith the air-passage *b*, the conical disks B D, having flaring curved partitions *d*, forming air-passages *e*, opening into passage *b*, and the overhanging capping G, substantially specified.

2. The combination, with the flue C, having projecting hooks *i*, of the capping G, having a peripheral notch or notches, substantially as specified.

 For drawings of above Ventilator see the other side.





# PERFECT VENTILATION

For Dwellings, Schools, Churches,  
Theatres Public Buildings &c.

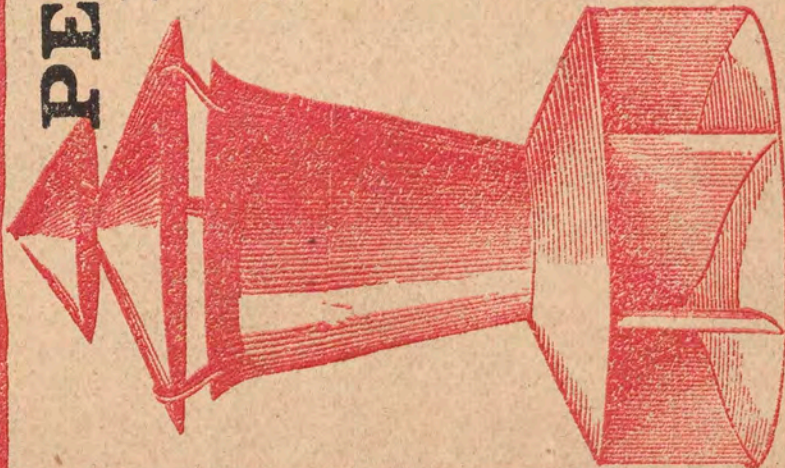
**SOMETHING NEVER BEFORE ACCOMPLISHED!  
All Impure Air Promptly Withdrawn.**

**No Necessity for Stifling, Confined Air in School-rooms, Offices or Public Buildings.**

The Universal House Ventilators are guaranteed to provide satisfactory ventilation for dwellings, offices, factories, etc. They also completely cure smoky chimneys, no back draft being possible; while rain, snow and dust are effectually excluded.

The Ventilator can be easily applied to any flue and at very little cost. For descriptive circular and price-list, address,

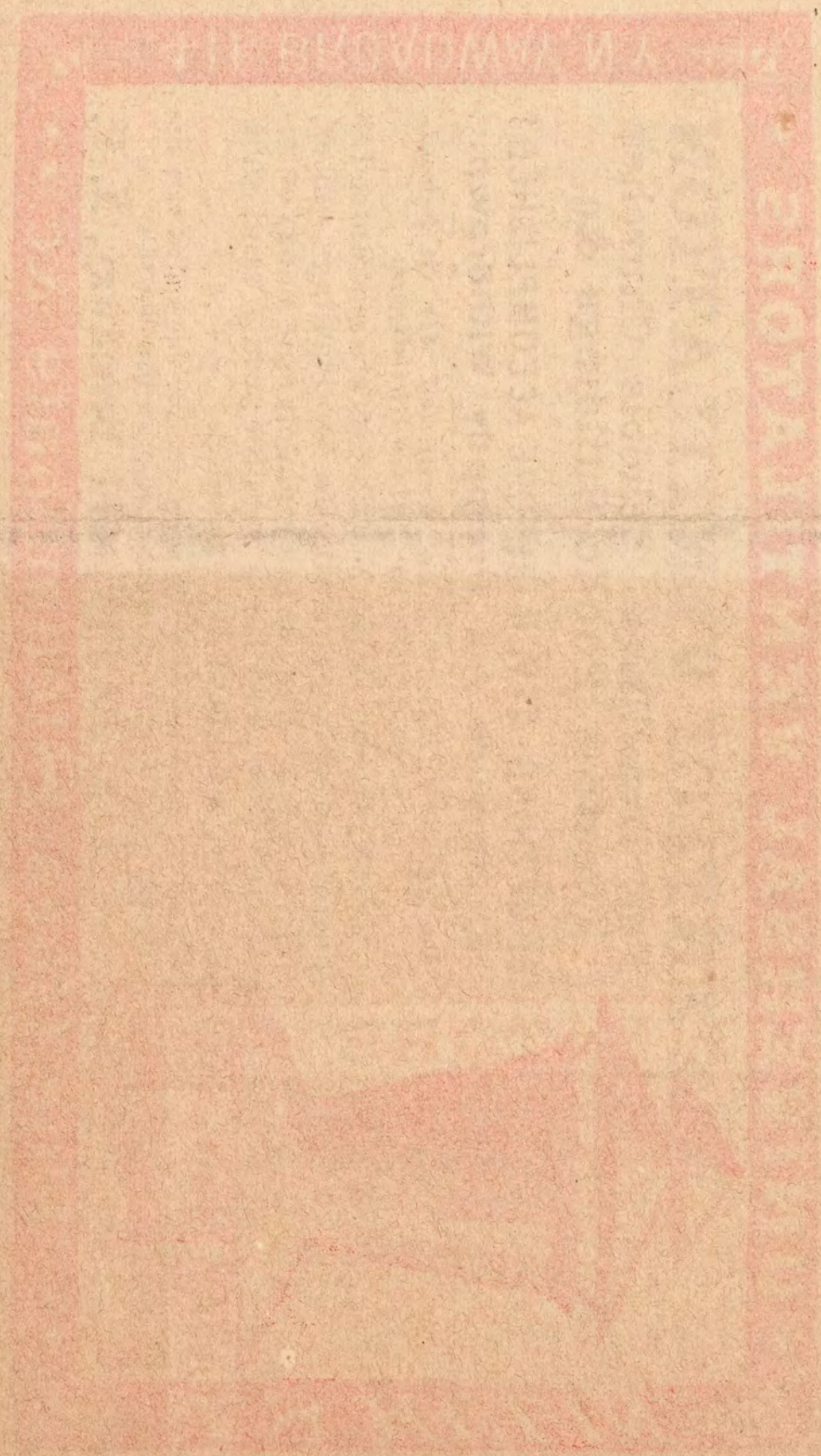
**J. S. HULIN, 411 Broadway, N. Y.**



*NIJHST*

For Cars, Steamboats &c. \*\*







Philadelphia

Blockley, Hospital

(Not)

~~Satterlee~~) J. M. Whitall's downwind ventilator.  
~~admirable~~ Steam heat, warm air flues;

open at floor one side — exit  
flue at floor the other side, into a  
having a draught from a fire below.  
~~vacant~~ chimney. Ventilates best

when windows closed. Prwy same —  
best after closing ventil. flue above.

Reapers stuff coats breeches in  
ventilators to keep out cool air!

~~Satterlee Hospital. no attics & wards,  
but only to kitchens & executive apartments.  
over~~



In a paper read recently (2  
(1873) before the Social Science Association  
in this city by the distinguished Dr. J. Kay,  
the ventilation of the Hospital at the Almshouse  
was remarked upon as incomplete; & this  
was sustained by <sup>two</sup> medical gentlemen pres-  
ent who were familiar with the Hospital. all  
admitted, however, — that the fault lies in the  
Construction of the buildings & the excessive  
number of patients; & that the ventilation was  
as good as the circumstances would allow, —  
much better than before the present method  
of ventilation was introduced. My own impres-  
sion of it has been mainly obtained from the account  
of it given by the <sup>catp</sup> President of the Board of Guardians, <sup>himself a very</sup> active and  
valuable member of the institution.



Recapitulation

or spontaneous

Purely "natural" plans

Chimney places —

Windows —

Doors —

Nest —

Wind sails &

(mulgah) funnels at roof —

& dikes or shafts with coals

or turncaps —

(anemometer)

(velocity of the wind from 1 mile per hour  
to <sup>or more</sup> 120 miles per hour or  
2 miles a minute —

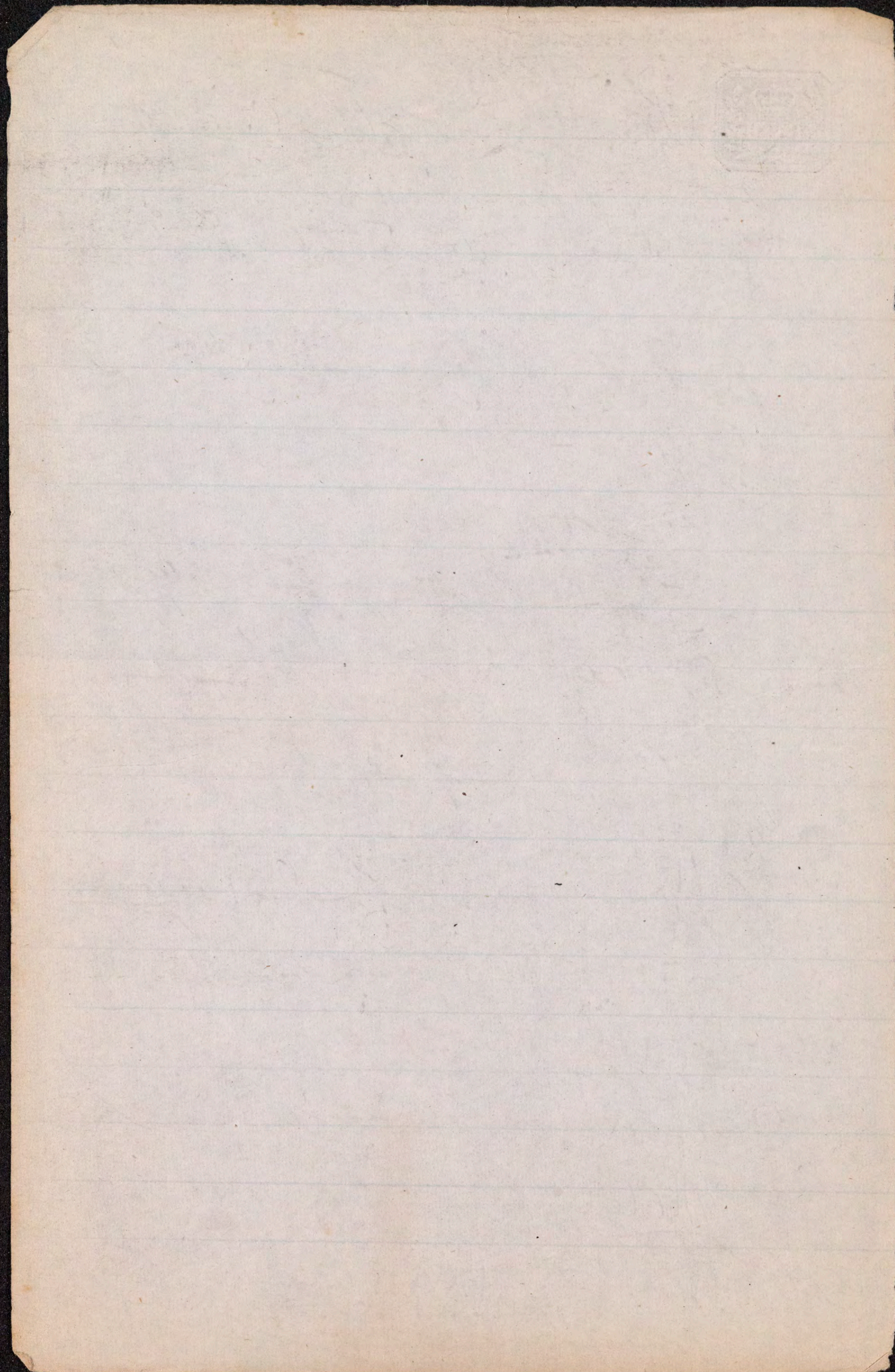
8 or 9 per hour average.

— Anemometers —

Mixed plans — more artificial —

Extraction by ~~water~~ heated shafts  
as at Lariboisiere <sup>1/2 of it</sup> by coils of steam pipe







~~Temporary British~~  
In ~~the~~ House of Parliamt -  
~~for use when required, for, holding, always, in the~~  
Principal Hospital of this City

Mines are well so  
ventilator

Ships, especially steamers,  
may be so also - though sometimes  
requiring more pure mechanical aid.

~~If we only valued the importance  
of removal of foul air, such as the  
clearest & best trust cause around them  
in time, - as we should, we might think  
it worthwhile to have fixed in every  
private house a place or purpose  
as in a plan & Dr. D. mentions in his book~~



→ Summer Ventilation of  
Hospitals needs and

( Drs Kirkbride  
Morton  
espinal )



Artificial ventilation  
is by fans, exhaustors  
propellers, or by pumps.

Désaguliers

Wales

Sylvester

Arnott

Reid

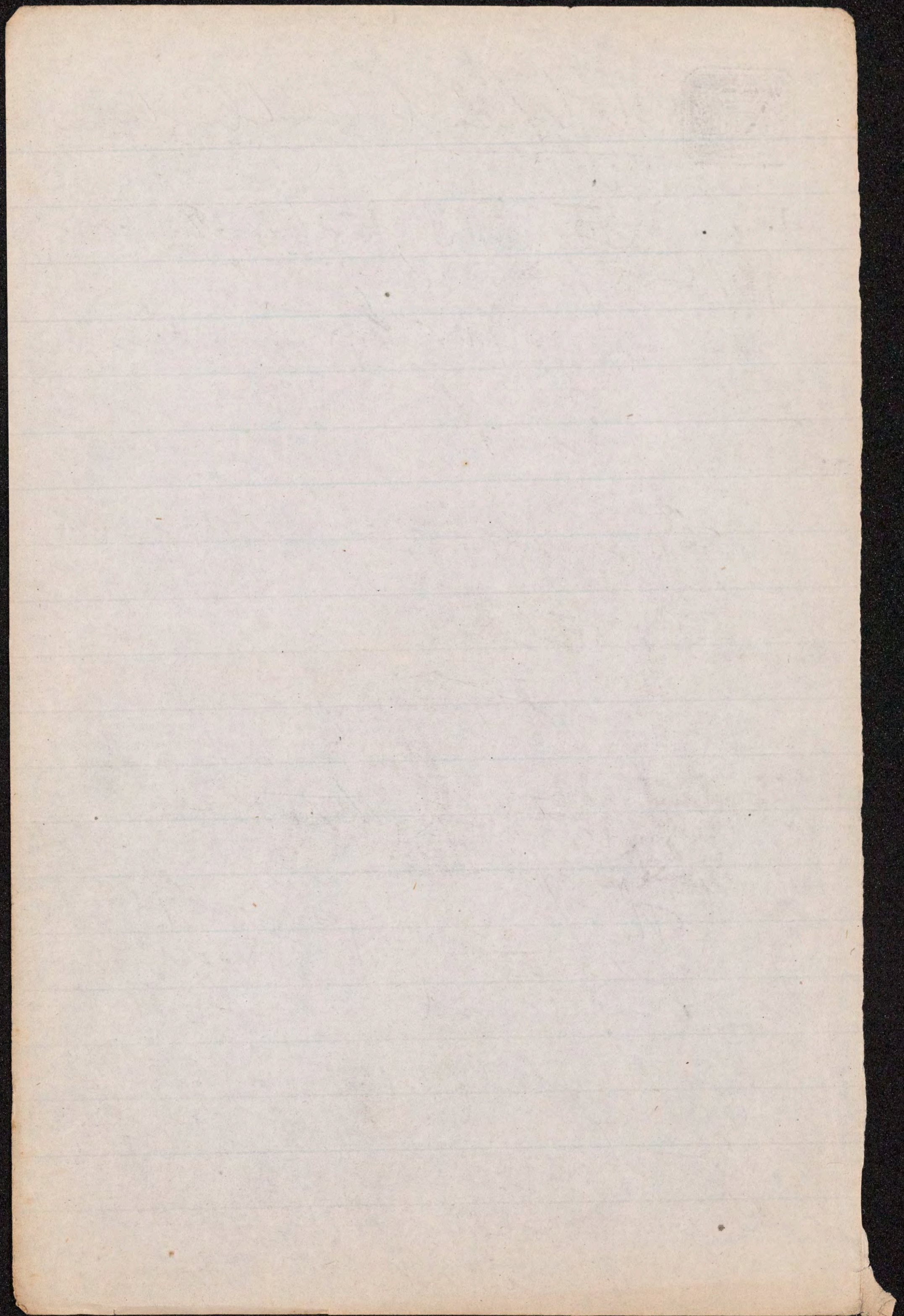
Duvon

& Van Hecke have especially  
tried & investigated these.

circular

The fan may have its vanes  
straight or curved; may have the  
hub of the wheel (or spokes) at the  
outlet from the room to be ventilated,  
so that the rotation of the fan will  
suck the air out as it rotates — or





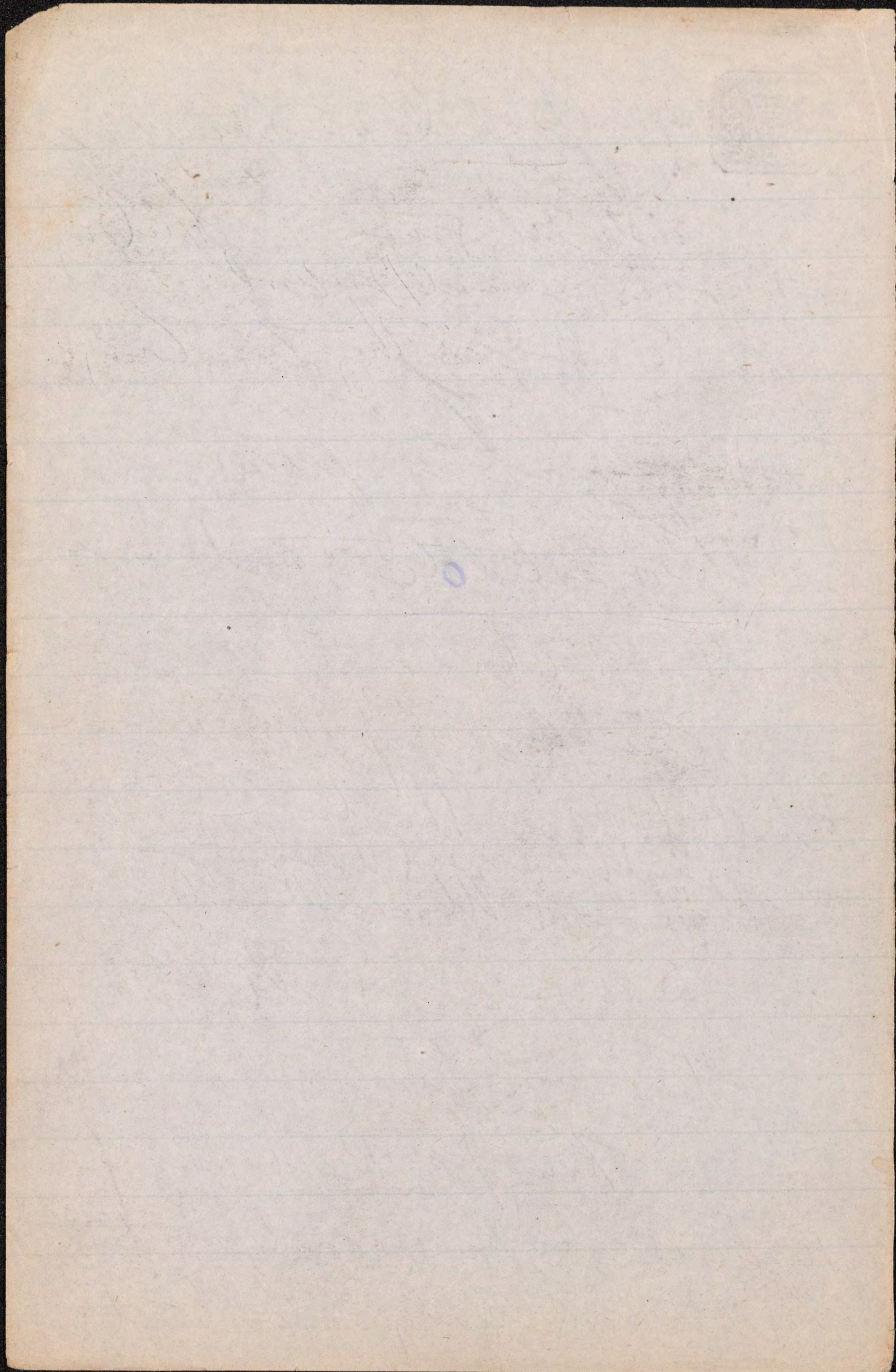


it may propel a draught of  
air into the room or building.  
The latter generally preferred  
In E. indeed they have long  
had such a fan, called  
a thermantide; much needed  
in India & China.

Our Acad of Music  
Chestnut St Theatre  
Dr Kirkbride's new Hospital  
Asylum at Utica N. Y.  
~~Mr George Hall Liverpool~~  
Many other institutions now are ventilated  
so.

Fans of Dr Reid were from  
10 to 15 or 20 ft diameter sometimes,  
Large & move slowly do the best.







Peclet a great French  
authority, declares for the  
fans against natural ven-  
tilation. <sup>his Duties of Arts</sup>

& <sup>Mr</sup> Tre, says heat used  
for steam fans will charge the  
air, for same fuel burned, 38  
times as well as a ventilation  
shaft for extraction by upward cur-  
rent of air caused by heat.

D. Parkes, however, considers  
that simplicity, greater equality,  
& safety, economy of labor, are best  
met by better shafts; & especially is this so

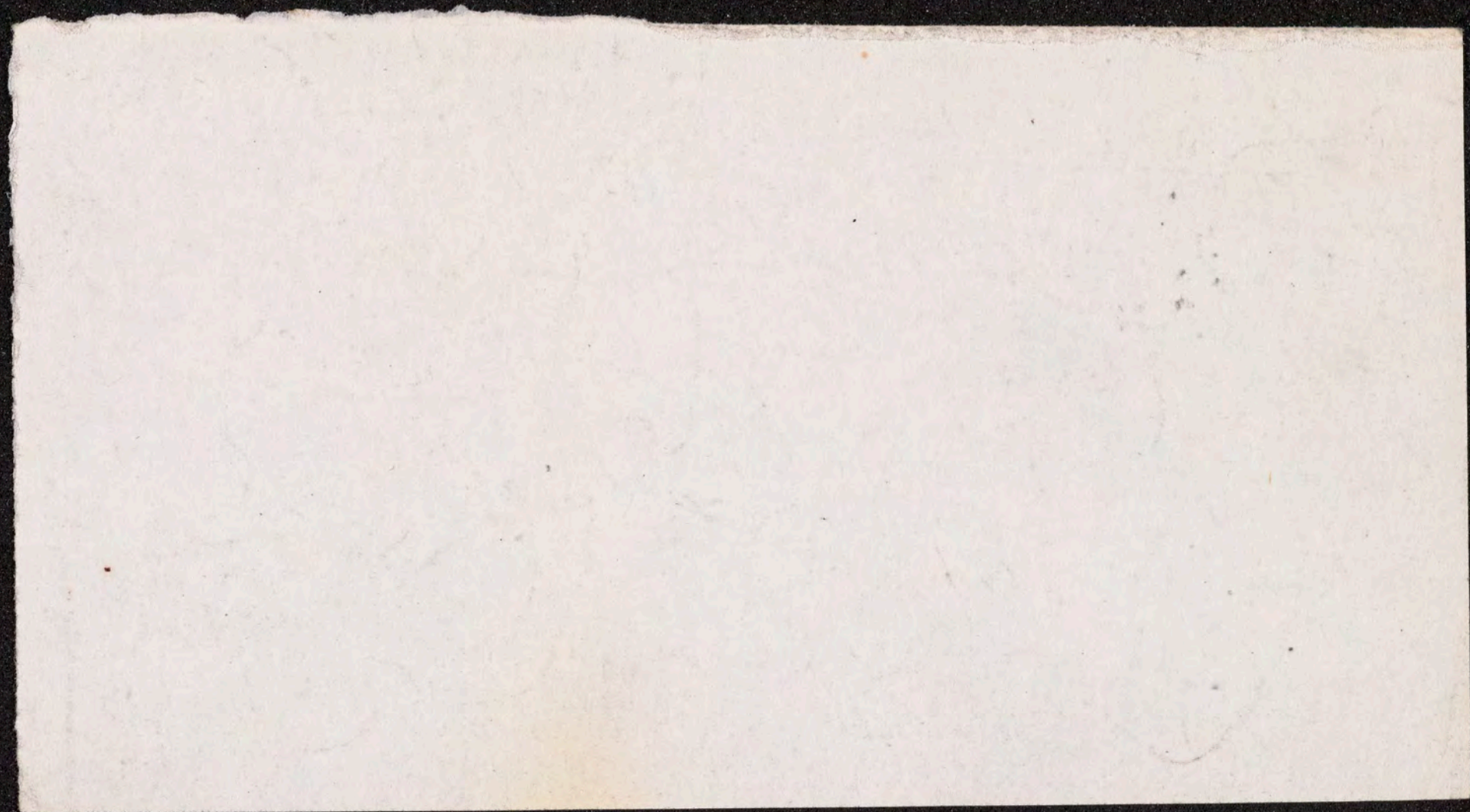






Dr Sarazin declares boldly that, in France,  
~~these~~ hospitals which are the least well  
ventilated are those whose administration  
has expended considerable sums <sup>expressly</sup> for ventil-  
-ation. Open fireplaces are, latterly,  
being introduced into Parisian hospitals.



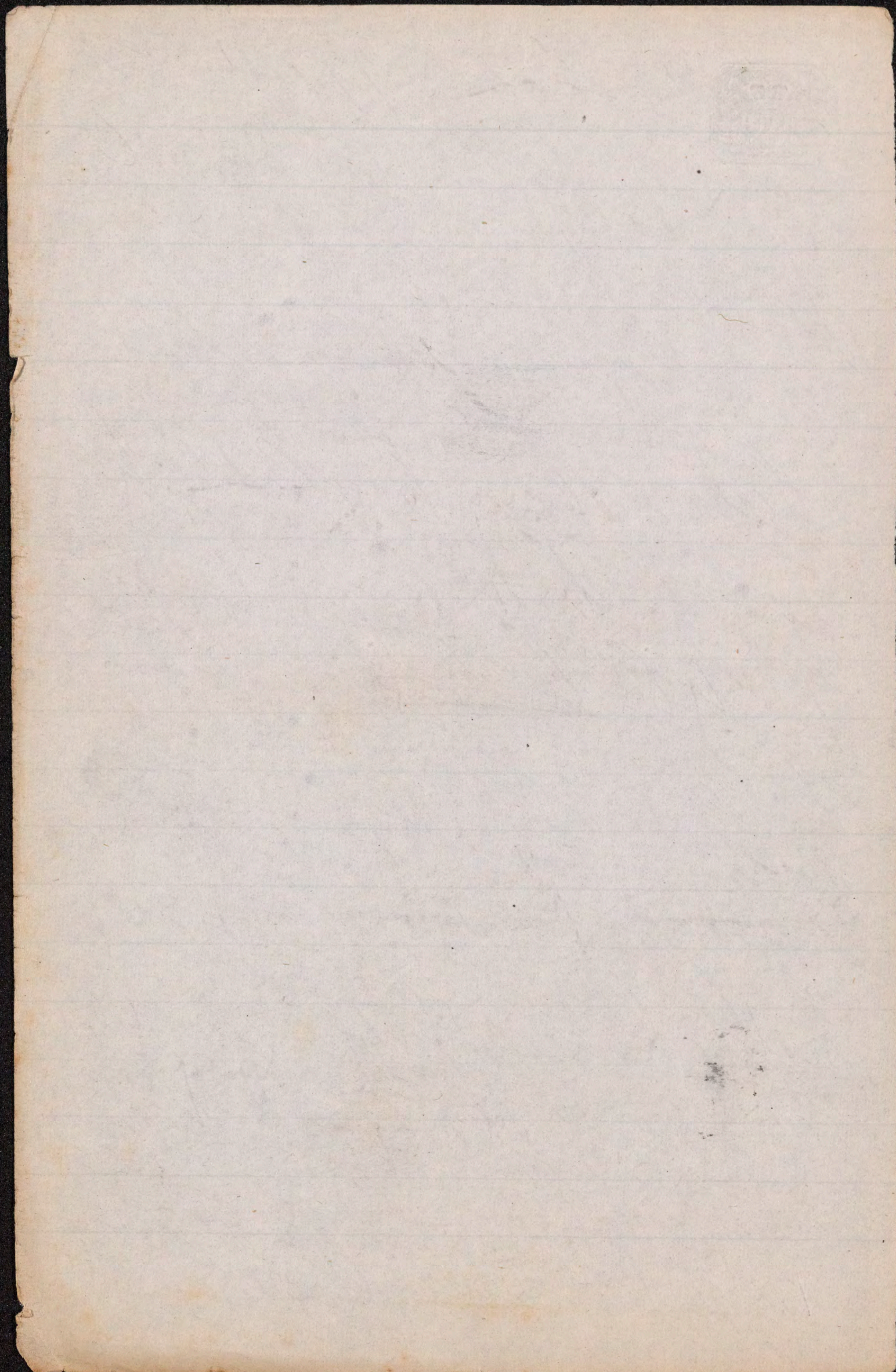




when the ~~heating~~ <sup>warming</sup> apparatus of the  
buildings can be made to  
produce the ventilating upward  
currents; as a half of <sup>at Paris.</sup> Saniborin.

Gen. Morin has ~~lately~~ shown  
that in that hospital in the  
H. which has a fan,  
the movement of air occurs  
nearly, is but 15 per cent due  
to the fan — 85 per cent to  
natural or spontaneous ventilation.  
Thus, we may, I think, conclude,  
are only required —  
1. In tropical climates —







ships or steamers,

2. In large vessels, especially  
with more than one deck & many  
passengers.

3. In ~~the~~ <sup>great</sup> public buildings  
such as House of Parliament, Theatres  
by <sup>sudden &</sup> habit to great collections  
of people, ~~at one time~~

4. Large factories & other  
buildings, with many rooms, - so  
situated as not to afford good  
opportunities for natural ventilation.  
Large Hospitals (Kirkbride) need them in summer time.  
Dr Arnott believed in the exhausting  
or propelling pump as better than the fan; others  
do not agree with him. One of his pumps is  
a sort of moving gasometer, run by water power.



\* March, 1876, air of House of U.S. Congress  
So horrible, that a Committee was appointed  
to investigate & remedy the trouble, to which  
several cases of illness were ascribed.

The member said that they were being  
"Murdered with scientific ventilation!"  
Much more probably, the proposed conditions  
for the use of the elaborate measures for  
ventilation were not maintained - through  
the common ignorance & negligence  
of subordinate officials concerned.



A NEW IDEA ABOUT VENTILATION.—How to purify sewers, and get rid of the pernicious effluvia which escape from them, is a subject which has baffled the invention and ingenuity of most civic bodies. M. Robinet, a French chemist, has devised a very effective means of freeing the sewers from them. His plan has already been carried out on a small scale. He proposes that the furnaces of factories shall derive their supply of air from the sewers; the latter will thus be emptied of their mephitic gases, which will be destroyed by combustion, fresh air from the atmosphere supplying their place. He calculates that if the combustion of only 70,000 tons of coal can be thus economized annually in Paris, or only one-tenth part of what is burned there, the sewers will be supplied with about 140,000,000 cubic feet of fresh air, that is, more than seven times their contents, daily.



generally were about a  $\frac{1}{4}$  per  
the second Board the market  
at the last Board there was a  
the leading descriptions. Mi-  
rose to 115, on rumors of a 15  
and next month. Annexed are  
ations on the street at 4 $\frac{1}{2}$  P. M:  
95 a  $\frac{1}{4}$ ; Erie 87 $\frac{1}{2}$  a  $\frac{3}{4}$ ; Hudson  
Mich. Cen. 114 $\frac{3}{4}$  a 115; Mich.  
a  $\frac{1}{2}$ ; Rock Island 111 $\frac{1}{4}$  a  $\frac{3}{8}$ ;  
 $\frac{5}{8}$ ; Fort Wayne 99 a 99 $\frac{1}{2}$ ; Ohio  
icates 27 $\frac{3}{4}$  a 28; Canton 40 $\frac{1}{4}$  a  
1 46 $\frac{1}{2}$  a 46 $\frac{3}{4}$ ; Mariposa M. C.  
ksilver 49 a 49 $\frac{1}{2}$ ; Central Coal

s.—The market for State and  
r is 5 a 10 cents lower for com-  
y firm for good grades. Sales  
\$7 40 a 7 75 for superfine State;  
extra do.: 8 a 8 25 for choice do.;  
for superfine Western; \$7 90 a  
on to medium extra Western.  
lower for Spring, and firmer  
ales 60 000 bushels at \$1 66 for  
ab, \$2 for inferior amber West-  
for very choice old amber Mi-  
at \$1 for Western. Oats



New House of Parliament,  
in London,  
— 2 towers, each 200 ft high, for  
supply of air — going in at a rear  
floors

Room heaters separate — by  
open fires & heater flues — all  
chimneys by flues converge at one  
to a central chimney, 250 ft  
high — \*

Proposed by (see sketch)  
Used in Belgium; but  
the amount of combustible in  
Lemon gas is not so remunerative;  
Something like it at Chertsey, 1873.

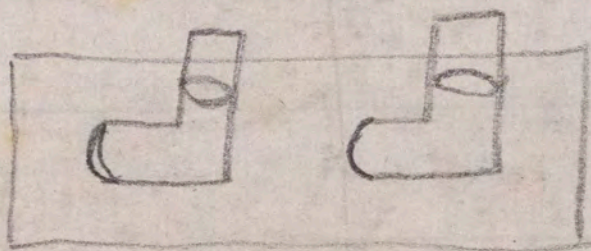


How to ventilate best & most safely

a sleeping - (or living) apartment  
by windows: (school-rooms - lecture-rooms &c.)

- Old air  
goes in  
below &  
out above
1. several small openings - above & below.  
curtains - furniture &c. between... My cases of  
Habit important. pneumonia, &c.
  2. piece of wood under lower sash.
  3. upsloping shelf or shingle, near open upper sash;  
or pane near top of window, hinged;
  4. perforated zinc plate, or wire-gauze, for a pane,
  5. best of all, double sash.

Maine's Window ventilators





The "UNIVERSAL" works on the ONLY PRINCIPLE by which  
Perfect Ventilation can be secured without Motive Power.

**UNIVERSAL VENTILATORS**



**PERFECT VENTILATION**  
For Dwellings, Schools, Churches,  
Theatres, Public Buildings, &c.  
**SOMETHING NEVER BEFORE ACCOMPLISHED!**  
**All Impure Air Promptly Withdrawn.**  
*No Necessity for Stifling, Confined Air in School-rooms, Offices or Public Buildings.*  
The Universal House Ventilators are guaranteed to provide satisfactory ventilation for dwellings, offices, factories, etc. They also completely cure smoky chimneys, no back draft being possible; while rain, snow and dust are effectually excluded.  
The Ventilator can be easily applied to any flue and at very little cost. For descriptive circular and price-list, address,  
**J. S. HULIN, 411 Broadway, N. Y.**

**For Cars, Steamboats &c.**

**J. S. HULIN**

**411 BROADWAY, N. Y.**

Correspondence solicited from School Boards and others  
who require Ventilators.

# "UNIVERSAL" HOUSE VENTILATOR,

FOR  
DWELLINGS, SCHOOLS, CHURCHES,  
THEATRES, PUBLIC BUILDINGS,  
&c., &c.

OFFICE, 411 BROADWAY, NEW YORK.

*John S. Hulin*

Proprietor.

To Manufacturers using Steam Power, and Suffering from Insufficient Draught, we specially call attention to the letter from the well-known firm of HENRY C. MYER & CO., printed on the fourth page of this circular.



## "Universal" House Ventilators.

---

The principle upon which this Ventilator is constructed causes the very lightest current of air (from any direction), to create a suction in the flue connecting it with the room to be ventilated,—the base of the Ventilator receiving the wind directly from any point of the compass.

There are no working, moving parts, hence there is no noise and no liability to get out of order.

The current of air entering at the base of the Ventilator, and escaping through the funnel, is made to first pass through spirally arranged air passages, surrounding the flue leading to the apartment to be ventilated. This whirling current creates a powerful upward draught through the ventilating flue, and draws off the heated, vitiated air from the room with which said flue is connected.

The double cap on the Ventilator protects the funnel from rain and snow, and the deflection of the hoods is such as to increase the draught created by the whirling current already mentioned, and to effectually prevent any BACK DRAUGHT.

These Ventilators, placed on heat-flues, prove a perfect cure for smoky chimneys.

They are in use extensively in New York City, Brooklyn, Jersey City, and in many other cities, and in every instance give entire satisfaction.

---

From the numerous TESTIMONIALS received, the following are selected :

Mr. URIAH WELCH, Proprietor of St. Nicholas Hotel,  
New York City, says :

NEW YORK, Nov. 15th, 1878.

Mr. JOHN S. HULIN.

*Dear Sir:*—We are greatly pleased with the results accomplished by using your Universal Ventilator in our Bake Rooms, and regard it as a perfect success.



DEPARTMENT OF PUBLIC INSTRUCTION, }  
OFFICE OF CLERK, SCHOOL NO. 5, BAY STREET. }

J. S. HULIN, Esq.

JERSEY CITY, Jan. 23d, 1879.

*Dear Sir:*—The following is a copy of a Report of the Committee on Heating and Ventilating, of the Board of Directors of Education of Jersey City, adopted Jan. 13th, 1879.

Respectfully, &c.

MARTIN FINCK, *Clerk.*

JERSEY CITY, Jan. 13th, 1879.

HON. BOARD OF DIRECTORS OF EDUCATION.

*Gentlemen:*—Your Committee respectfully report that they have placed in one of the rooms of School Building No. 6, one of the "Universal" Ventilators, which has given perfect satisfaction. In view of the presentation of Bill for same by the Proprietor, Mr. JOHN S. HULIN, this Committee report that they have carefully examined the work, and inquired into results obtained. That they cannot improve upon the Report of the Principal, Mr. J. W. WAKEMAN, who endorses the Bill—"The Ventilator works to a charm."

Respectfully submitted.

PETER SCANLAN, }  
CHARLES H. MOORE, } *Committee.*

JERSEY CITY, Jan. 21st, 1879.

JOHN S. HULIN, Esq.

*Dear Sir:*—The "Universal" Ventilator which you placed in my Class Room, No. 24, School Building No. 6, Jersey City, gives entire satisfaction. IT THOROUGHLY VENTILATES A ROOM WHOSE PECULIAR LOCATION RENDERED IT ALMOST IMPOSSIBLE TO OBTAIN ANY VENTILATION WHATEVER. You have so arranged your registers as to produce the most perfect diffusion of fresh air without sensible draughts.

Respectfully yours,

J. W. WAKEMAN, *Principal Public School No. 6.*

SOUTHWORTH COMPANY,  
MANUFACTURERS OF WRITING AND LEDGER PAPERS.

MITTINEAQUE, MASS., March 19th, 1879.

JOHN S. HULIN, Esq., 411 Broadway, New York.

*Dear Sir:*—The Universal House Ventilator you recently placed in our Rag Room, meets our full expectation, and it affords us pleasure to recommend it to all who feel the importance (as we did), of relieving our Rag Room of the unpleasant dust that the dusting and cutting of rags occasions.

Yours truly,

SOUTHWORTH COMPANY,

WELLS SOUTHWORTH, *President.*

OFFICE OF THE CAREW MANUFACTURING CO.,  
SOUTH HADLEY FALLS, MASS., MAY 5, 1879.

Mr. JOHN S. HULIN, Esq.,

*Dear Sir:*—"We put on your Ventilator on the first day of this month. I must say, that it works the best of anything we ever used, and if it continues to work as well as it has, I think you will sell a good many in Holyoke."

Yours truly,

J. CAREW, *Agent.*



The Universal Ventilators are also used to increase draught for Boilers, and saves more than the cost of them in fuel.

JOHN S. HULIN, Esq.

*Dear Sir:*—We have much pleasure in stating that the “Universal” Ventilator which you placed on our flue has proved a success.

Before you put it on, we were continually annoyed by lack of draught and inability to get the proper power steadily out of our engine; now we seem to have a good draught all the time, and no trouble to keep up steam, AND SAVE DAILY ABOUT 25 PER CENT. OF THE FUEL WE FORMERLY USED. We cheerfully recommend the Ventilators to those situated as we were.

Respectfully,

HENRY C. MYER & Co.,

46 & 48 CLIFF ST.

NEW YORK, Feb. 3, 1879.

Mr. JOSEPH POOL, President Manufacturers' and Merchants' Bank, 527 Broadway, New York City, says:

NEW YORK, Nov. 14th, 1878.

Mr. JOHN S. HULIN, 411 Broadway.

*Dear Sir:*—I received your letter, making inquiry about the “Universal Ventilator” which was put in our Banking Room some four months ago.

I am well pleased with the good it has done in ventilating our room.

Our employees, who remain in the Bank nights as well as days, speak of the great relief from impure air, since we have had the Ventilators.

## PRICE LIST.

**No. 1**—4 in. diameter, . . . . . \$12 00

**No. 2**—5 “ “ . . . . . 15 00

**No. 3**—6 “ “ . . . . . 18 00

**No. 4**—8 in. diameter, 3 ft. high, . . . . . 20 00

This size is frequently placed on smoke flues having defective draught.

**No. 5**—10 in. diameter, 3½ ft. high, . . . . . 25 00

**No. 6**—12 in. diameter, 4 ft. high, . . . . . 30 00

Adapted to ventilating dwelling apartments.

**No. 7**—16 in. diameter, 4½ ft. high, . . . . . 40 00

**No. 8**—20 in. diameter, 5 ft. high, . . . . . 45 00

Of proper size for Bank Offices, Court Rooms, etc.

**No. 9**—24 in. diameter, 6 ft. high, . . . . . 50 00

Applied to ventilation of Public Buildings, Theatres, Schools and Concert Rooms.

No. 7, 8 and 9 are also used in the ventilation of Steamships, and of Vessels employed in transportation of meats, fruits, etc,

We can make these Ventilators to fit any flue. The smaller sizes, 4, 5 and 6 inch diameter are used principally for Chimney Caps.

**SPECIAL SIZES** can be made to order.







